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HARRIS BANKS' NEW GEOGRAPHY OF CALIFORNIA, THE UNITED STATES AND THE WORLD



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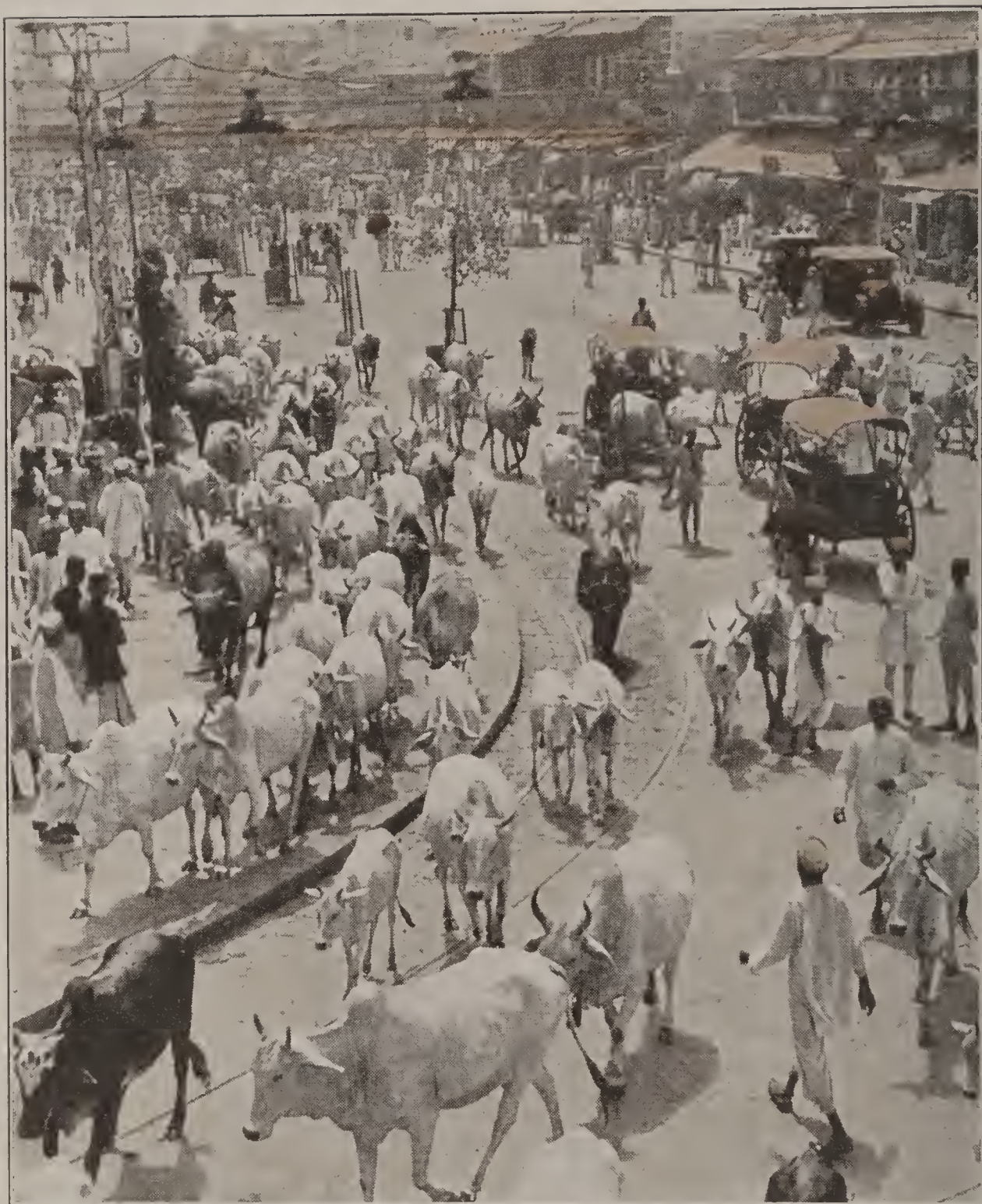


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Hindu cows in the streets of Delhi, India. Compare this picture with the cattle scene on page 17 of this book.

FAIRBANKS' NEW GEOGRAPHY

OF

CALIFORNIA, THE UNITED STATES AND THE
WORLD FROM THE POINT OF VIEW
OF CALIFORNIA CHILDREN

BY

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California Developed According to the Problem Method, Stories of
Our Mother Earth, Home Geography, The Home and Its Relation to
the World, Outlines of the Continent, Rocks and Minerals, The
Western United States. Physical Physiography



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CONTENTS

PART I. CALIFORNIA

Chapter		Page
	Introduction	7
1	Climate of California.....	9
2	Natural Resources	16
3	Advantages and Disadvantages.....	30
4	How Industries Have Changed.....	42
5	Accessibility of California.....	45
6	Centers of Trades and Industry.....	53
7	Attractions for Visitors.....	61
8	Problem of San Francisco.....	64
9	Problem of Los Angeles.....	69

PART II. THE UNITED STATES

10	Climate Compared with California.....	79
11	People of North America.....	87
12	Animal and Fish Life.....	91
13	Growth of Farming.....	96
14	Stock Raising Industries.....	111
15	Lumber Industry	115
16	Manufacturing Industry	122
17	Growth of Great Cities.....	129
18	Advantages of the United States.....	134

PART III. THE LANDS BEYOND THE OCEAN

	Introduction	140
19	Mediterranean Lands of the Northern Hemisphere.....	142

20	Mediterranean Lands of the Southern Hemisphere	148
21	Food Products Which We Get From Foreign Lands.....	153
22	Food and Food Products From the Island of Java.....	155
	a. Products of the Palm Tree.....	162
23	Other Foods and Food Products.....	167
	b. Rice and Sugar	167
	c. Tea, Coffee, Cocoa.....	169
	d. Medicinal Substances	174
24	Clothing Materials	178
	a. Wool	178
	b. Cotton	182
	c. Flax	185
	d. Hides	186
	e. Silk	193
	f. Furs	195
25	Trees, Plants, Minerals, Etc., From Other Countries.....	199
	a. Woods and Fibers.....	199
	b. Minerals and Precious Stones.....	201

A READER IN THE GEOGRAPHY OF CALIFORNIA,
THE UNITED STATES, AND THE WORLD
FROM THE POINT OF VIEW OF
CALIFORNIA CHILDREN.

PART I.

California—The Wonderland

GENERAL PROBLEM.

A large part of California is occupied by mountains, another part is a desert. The largest rivers are navigable for only a short distance, and there are few good harbors. What is the reason that in spite of what seems to be serious disadvantages California has grown in a few years from a thinly settled and almost unknown land to one of the foremost states in the Union? Will not the following facts help us to solve the problem?

1st—California has great natural wealth and a variety of scenery.

2nd—California has a healthful and agreeable climate.

3rd—Anyone, no matter what his occupation, can make a home in California and carry on his work amid pleasant surroundings.

INTRODUCTION.

1. The first people to come to California in large numbers were miners, attracted by the stores of gold in its mountains.

2. The stockman sought California because of the absence of cold winters and the great extent of land affording forage for his cattle and sheep.

3. Farmers came to California because of the rich soil of the valleys, where, under sunny skies, they could raise almost everything they wished.

4. The fruit grower found in California climates of so many different sorts that they could raise almost every variety of temperate and tropical fruits.

5. The dairyman found in California a land where he could produce and market milk, butter and cheese and could grow cheaply the grain and alfalfa for his cattle.

6. The poultryman found that the climate was favorable to raising chickens and turkeys and eggs and the large cities afforded a good market.

7. The lumberman came to supply the rapidly growing population with lumber for their houses from the heavy forests that flourished on the mountain slopes.

8. Fishermen make good catches in the broad belt of shallow water that forms a feeding and spawning ground for a great variety of food fishes.

9. The manufacturer once shunned California because he thought it had little fuel and that the water power could not be used because it was so far away in the mountains. Now unlimited quantities of fuel oil have been discovered and we have learned how to turn the power of the distant waterfalls into electricity and carry it wherever we wish to use it.

10. Traders found that the harbors of California, though they were limited in number, formed open doors through which produce could be exchanged with all the world.

11. People who were not well came because of the health-giving air of the coast, deserts and mountains.

CHAPTER 1.

WHY DOES CALIFORNIA OFFER SUCH AN ATTRACTIVE CLIMATE?

California lies, as can be seen from the map, about half way between the cold and snowy belt around the north pole, and the hot wet belt following the equator. It extends north-erly and southerly along the Pacific ocean for about 800 miles, but owing to the influence of this great body of water there is much less difference in temperature between the north and the south than we would expect. How, then, is it that California has a climate which varies so greatly in different parts that every plant which is found between the tropics and the arctic circle will grow and thrive here? It is important that we find out the answer to this question, since it will help us to understand why California is such a great and prosperous state.

1. Everyone has noticed that the winds usually blow from some westerly point; in so doing they must pass over the ocean before they reach the land. Everyone has also noticed, if he will stop to think a moment, that these winds are always cool. Since the ocean changes its temperature but little throughout the year and is cool along the whole extent of the California coast, the winds that blow across it are but little warmer at San Diego than they are at Crescent City, near the Oregon line. If we should travel from New York southward along the Atlantic coast a distance equal to the length of California we would find a much greater difference in temperature. This is mainly because the winds along the Atlantic coast are commonly from the same westerly direction as in California, but there they are from the land. Call to mind how hot our land winds are in the summer and how cold in winter and you will understand why the people upon the Atlantic coast suffer so much greater changes in temperature than we do. We conclude then that a coast that has sea winds has an even temperature and one that has land winds has great variations in temperature.

2. We have discovered that the wind by itself would give the coast of California an even temperature, but when we come to study the winds in connection with the position of the moun-

tain ranges, their extent and height, we learn why the climate varies so greatly in different places and why we are able to raise such a wonderful variety of products.

Most of the mountain ranges of California run lengthwise of the state; that is, in a northerly and southerly direction. The San Gabriel and San Bernardino ranges which extend east and west are the chief exceptions.

We have only to remember how much warmer it is behind a beach umbrella when the wind is blowing off the ocean, or that in the winter, when there is a warm rain in the valleys, there is a snow storm upon the mountains, in order to understand what a great influence the mountains have upon California climate. We must not forget, however, that if there were no mountains, but that instead a vast plain stretched inland from the ocean, the cool winds would become warm in summer when they had passed far enough over the land and icy in winter, but the mountains make this change much quicker and sharper.

Mountain ranges border the coast of California nearly its whole length, the exception being the plain-like region to the south and southwest of Los Angeles. The cool winds blowing against these mountains are broken so that the valleys lying behind them become very warm. Neither the sea fog nor the wind can reach them. Thus, if you want to find the hottest place in western California upon a summer day you should go to the east side of one of the lofty Coast Ranges.

This will enable us to understand why the earliest cherries come from the Capay valley west of Sacramento and close under the lee of a lofty range of mountains. It enables us to understand also why the earliest oranges come from the San Joaquin and Sacramento valleys. No cool sea winds or fogs reach the eastern side of these valleys, while the Los Angeles-San Bernardino valley, the largest orange growing region in the State, is open to the ocean winds and fogs. The same thing also explains why great quantities of raisins are made around Fresno in the San Joaquin valley, and none are made in the Los Angeles-San Bernardino valley, although it is farther south.

From what we have already learned, if one wishes to find the hottest place in California, would he not cross the next range of mountains toward the east? What is this range? Death Valley and its extension south in the Mohave desert,

together with Imperial valley, have a great summer heat. In Death Valley one does not attempt to travel in the open sun in summer, but always at night.

3. The varying amount of rainfall in different parts of the State is another factor in climate which has a very great influence upon the distribution of people and what they do.

If you will study the rainfall map you will discover that in the northwestern part of the State 80 inches of rain may fall in a year, while in the southeastern part it is usually not more than two or three inches. Should we not expect to find a great difference in the plants that thrive in two regions with such difference in rainfall? In the northwest corner vegetation is luxuriant and dense. The farmer has to clear the land at great expense before he can grow anything and does not need to employ irrigation. In the deserts of the southeast the vegetation is scanty and has been changed in many curious ways by its struggle to live through the long hot summers. People can not live in the desert unless they can obtain water for irrigation, but when water can be had everything grows with astonishing luxuriance.



A road-side scene in a valley of the Northern Coast Ranges. The vegetation is rank because of the heavy rainfall. There are red-woods, spruce, sycamore, laurel and many kinds of oaks.

The difference in rainfall is partly due to the fact that the storms which come in from the ocean are more numerous and severe as one goes north, and partly to the influence of the mountains.

The mountain ranges lying across the path of the ocean storms affect the rains as they do the fogs and temperature. More rain falls on the western slope of the Coast Range than in the San Joaquin valley at its eastern base. More snow and rain fall on the still higher Sierras, because their summits are colder. These high mountains condense so much of the moisture, as the clouds pass over them, that eastern California gets very little rain and is barren and desert-like. Once in a while rains do fall in the desert and are accompanied by terrific thunder and lightning. The rain sometimes comes in torrents or cloudbursts, which do great damage to the country.

4. Mountains make a variety in climate and add untold wealth to the State through the increase in rainfall caused by their cold summits.

We have all seen the dark clouds hang over the mountains, while the sun was shining brightly in the lowlands where we live. We have seen the lightning and heard the thunder of the mountain storms during the summer. If you will watch the Weather Bureau reports of winter storms you will often notice that, if an inch of water fell where you live, the mountain station reported two to four inches. This is true not only of our mountains, but of mountains all over the world, and particularly noticeable in lands where the general rainfall is light.

If you will study the map of California you will discover that all the large rivers rise in mountains and that the higher the mountains are the larger the rivers are that rise in them.

The moisture that the air carries over the mountains is condensed to rain or snow, because of the cold, in just the same way as the water particles are condensed upon the outside of a glass of ice water upon a warm summer day.

Although mountains may seem, at first thought, to be of little use, yet when we understand them fully and learn how they make our rivers, without which the land of our valleys could not be cultivated, we appreciate their value.

We have seen that the mountains cut off the moist winds from the valleys to the eastward of them, but at the same time they take much more moisture out of the clouds than would fall if they were not there, and send down rivers to the farmer

to make up for lack of rain. Note on the map the rivers that flow down the eastern slope of the Sierra Nevada mountains and find out what you can about the prosperous settlements along their course in the desert.

Along the eastern base of the Coast Ranges in the Great Valley, you will not find many permanent streams, because the slope is so short and the crests are not nearly so high as those of the Sierras. Note from the map if there are many towns along the east base of the Coast Ranges.

So many storms pass across the northern end of the State that this section would be fairly well watered if there were no mountains, but the greater part of the interior of California would be uninhabitable desert if there were not somewhere within reach high mountains to collect the rains and send them down streams across this desert to the ocean.

5. Can you think of any other influence which mountains have upon the prosperity and industries of California? Let us talk for a few moments about the cold of their highlands.

Since California lies about half way between the hot and the cold belts, we would not expect to find a cold climate there; in fact, we know the greater part of the lowland valleys possesses so mild a climate that all sorts of semi-tropical fruits thrive.

We can see the mountains turn white with snow when winter comes; the snow lasts many months, and if we were to climb some of the higher peaks we would discover that it remains all summer upon the shady slopes. A summer camping trip to the summit of one of our lofty ranges shows how very different mountain climate is from valley climate in the same latitude.

At the base of the mountains are orange orchards, which may reach up to 2000 feet. This is as high as the orange thrives in California, because above that the winter nights are too cold. Above the orange orchards and up to perhaps 3000 feet there are peaches, pears and cherries, while apples reach up to 5000 feet. This is as high as the farmer can make his home, but as frosty nights do not prevent grass growing, the stockman can go higher still.

Above where fruit can be raised successfully is the belt in which our great forests are found, where huge trees of many kinds find a climate that is just suited to their needs.

We continue on to 8000 and 9000 feet, where the forest trees begin to be smaller and less thrifty. At 11,000 feet only a few stunted ones are found clinging close to the ground to escape the fierce winter winds. We are now in a region that has a climate similar to that of the arctic regions. The winters are so long and cold, the summer nights so frosty, that only in protected nooks among the rocks a scanty vegetation manages to exist. Here are arctic shrubs and pretty stunted arctic flowers. The animals belong to northern varieties, and the few birds have migrated here only for the nesting season, just as the ducks and geese go far north in the summer to their nesting grounds.

In climbing one of our high mountains one passes through all the different climates which one would encounter in traveling thousands of miles from the tropics to the arctic region.

The cold winters of the mountains are very important for the growth of California, for they cause snow to fall instead of rain, which would quickly run away to the ocean, while the snow does not melt until the warm sun of spring and summer strikes it, and thus affords a supply of water when the farmer needs it. If it were not for the mountain snow-banks the streams would run almost dry in summer and there would be dangerous floods in the winter.

California has, then, because of its situation in the warm temperate latitude, its situation upon the coast, its cool westerly winds, its high mountain ranges, its many storms in the northwest, its almost entire absence of storms in the southeast, such a variety of climate that people coming here from almost any part of the earth can find a place for a new home where the climate and productions would be similar to those of their homeland.

WHY IS IT THAT CALIFORNIA DOES NOT GROW THE FRUITS OF THE TROPICS ALTHOUGH THE HEAT OF SOME OF THE INTERIOR VALLEYS IS FULLY AS GREAT AS THAT OF LANDS WHERE THE SUN SHINES DIRECTLY OVERHEAD?

The lowlands of the tropics are not only hot, but also very moist. Since the sun is there almost, or quite overhead throughout the whole year, the temperature remains almost the same. The fact that one season is a little drier than the other is almost the only thing which distinguishes winter from summer.

California, with its hot regions such as Death Valley and Imperial valley, lies farther from the equator and the seasonal changes are greater. In summer Death Valley is hotter than the lands under the equator, while in winter it frequently becomes cold enough to freeze.

In the tropics the air is moist as well as hot. In Death Valley it is hot and exceedingly dry in summer. Some subtropical plants, such as the date, thrive in a hot, dry air and are not injured by a little frost. Thus in the Imperial and the Coachella valleys are growing Sahara desert date palms successfully.

Most tropical plants require not only much water but also moist air. The moist hot air we can get only in a conservatory, and not out of doors. Most tropical plants cannot stand the least touch of frost, and there are likely to be some frosty winter nights in even the hottest valleys of California.

Rice, which comes to us from the tropics, thrives in California because it is planted in the spring, like other grains, and matures its seed before cold weather comes in the fall.



Rice fields in the San Joaquin Valley.

CHAPTER 2.

THE MANY SIDED CLIMATE OF CALIFORNIA MAKES IT A LITTLE WORLD IN ITSELF, WHERE ALMOST EVERYTHING CAN BE GROWN. HOWEVER, THIS WONDERFUL CLIMATE ALONE DOES NOT EXPLAIN WHY THERE ARE SO MANY OCCUPATIONS CARRIED ON HERE. WE MUST ALSO TAKE INTO ACCOUNT THE CHARACTER OF THE SURFACE, NATURAL RESOURCES, THE NATURE OF THE RIVERS AND COAST, RAINFALL AND THE EASE OF COMMUNICATION WITH OTHER PARTS OF THE WORLD.

A. In How Far Have the Surface Features Aided in Making California a Land of Many Industries?

If California were a vast plain, like much of the Mississippi Valley, Southern Russia and Argentina, the life, conditions and industries would be much the same over its whole extent. California is, however, one of the most broken and mountainous countries of the world, but its area is so large that in spite of the mountains there are fertile lowlands large enough to support many millions of farmers and fruit growers.

The State contains Mt. Whitney, the highest mountain in the United States outside of Alaska, and Mt. Shasta, one of the loftiest extinct volcanoes.

The Sierra Nevada and Coast Ranges inclose the lozenge-shaped San Joaquin-Sacramento valley, the largest fertile and well watered lowland in western North America. The most of this valley is still thinly settled. The island of Java, in the East Indies, which is no larger, supports thirty million people, most of whom depend upon the soil.

There are also many beautiful and fertile valleys among the Coast Ranges. In the south there are the Los Angeles-San Bernardino valley, Imperial valley, San Fernando valley, and numerous others.

Great areas of fertile land in the deserts of eastern California remain unproductive for lack of water. Some of these will probably some time get water from the Colorado river.

In the foothills and lower mountains much of the land is too rough and rocky for cultivation. The people who live upon

these slopes engage in the mixed occupations of general farming, fruit growing and stock raising. Some kinds of fruit, such as apples, pears and prunes, take on a better quality in these higher lands and command a better price in the markets. The slopes, too rough for any kind of cultivation, support hogs and beef cattle.

2. **The surface features influence the character and distribution of the stock-raising industry:** Great numbers of hogs are raised in the foothills because there they have a large range and almost support themselves. In the valleys, where the land is more valuable, they are not, however, allowed to range but are kept in small enclosures and fed grain, corn and alfalfa, raised by their owners.

Sheep were once allowed to range freely over the public lands, but they did so much damage to vegetation upon the mountains that their pastures are restricted. They dispute with cattle the remote and inaccessible slopes where farming cannot profitably be carried on. The farmer needs good roads to get his products to market, but stock can be driven over rough mountain trails.

Nearly all the region of the Coast Ranges where rains afford grasses was once given over to raising beef cattle. Some of the great ranches still exist and are used as cattle ranges today, but most of them have been cut up into farms,



Cattle grazing in a mountain valley.

so that now there are thousands of homes where once there was only one.

The raising of range cattle is now confined to the rough and rather inaccessible portions of the Sierra Nevada and Klamath mountains, the volcanic plateau in northeastern California, and the mountains of southern California.

B. In How Far Have the Natural Resources Aided in Making California a State of Many Industries?

1. California is rich in deposits of minerals of many kinds: It was the discovery of gold in the gravels of the streams of the Sierra Nevada mountains that started the rapid growth of California. Mining was the first important industry of the State. The men who sought gold in the gravels were called "placer miners". These men were followed by "quartz miners", who dug deep shafts and long tunnels in the earth as they followed the veins of gold bearing quartz. In other parts of the State, silver, lead, copper and quicksilver mining are carried on.

Mining is important in California, partly because this is a land of mountains. If there were no mountains, upon whose steep sides the rocks that contain the various minerals are exposed, the soil would cover the rocks so deeply that we would not be able to find these minerals.

But metal mining is not the only kind of mining in California. In the desert basins of California are found deposits of salt, soda, borax and nitrates. Long ago, when the climate was wetter than it is now, these basins were occupied by lakes which had no outlets. The various salts which we have mentioned were dissolved in the water, but when this dried up they were left mixed with the mud upon the bottoms.

There are few coal mines in California, for the beds of coal are small and of rather poor quality. Coal is formed from the accumulation of vegetable matter in swamps. Long ago there were vast swamps in the central and eastern part of the United States, and in them was formed the coal that is such a necessity for heating and manufacturing. California must always have been mountainous, with few swamps in which the material for coal could gather.

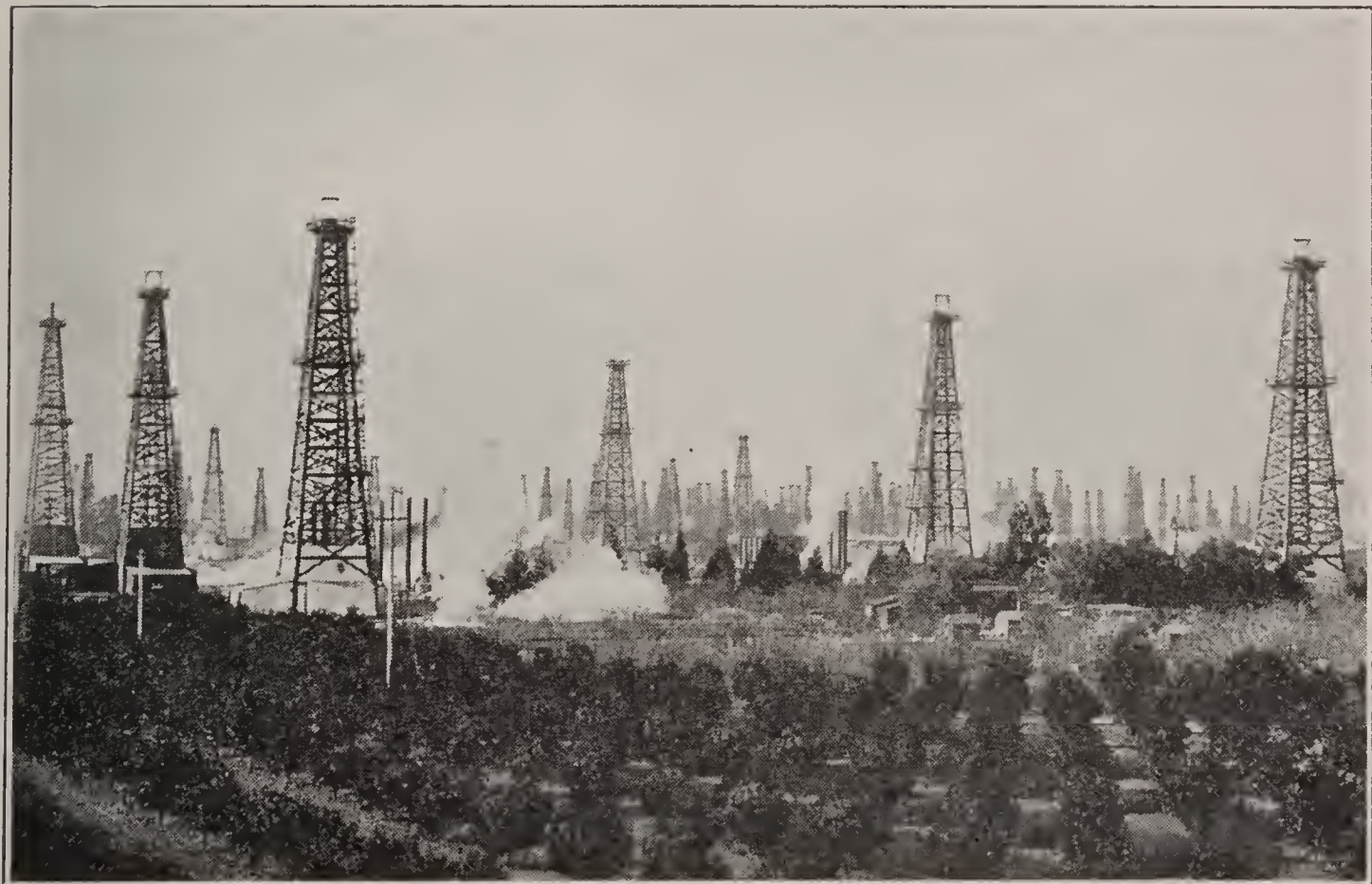
Most of the coal used in California is either brought upon ships from distant lands or upon railroads from the Rocky Mountain region. The lack of cheap coal delayed for many years the growth of manufacturing industries.

Now, however, something has been found which takes the place of coal for most purposes. This is petroleum, and California has become one of the most important centers in the world for this industry.

In the foothills bordering the central and southern part of the San Joaquin valley, in the Coast Ranges and in the region about Los Angeles there are thousands of wells producing millions of barrels of oil yearly. The heavier varieties of this oil are used for fuel, while from the lighter ones gasoline and lubricating oils are extracted. The drilling of wells, the pumping, refining and shipping of the petroleum has become the most important mining industry in the State and employs many thousands of men.

The deposits of precious metals were formed in fissures in the rocks as the mountains grew. Hot water crept up through these fissures from far down in the earth, bringing with it different minerals in solution. These minerals were deposited in the fissures or veins.

The story of petroleum is very different from that of either coal or the metals. Those parts of California where petroleum is found were once beneath the ocean. The waters



The Santa Fe Springs Oil District near Los Angeles. Note that the wells have been drilled right in the midst of orange groves.

of this were filled with fish and an infinite number of tiny sea animals and plants. As these animals died their bodies settled to the bottom and finally became deeply buried beneath sand and mud. After a long time, when these deposits had been turned into rock, the sea bottom was raised and became dry land. The soft parts of the little organisms buried in the rocks gave rise to illuminating gas and petroleum which collected in any porous rocks which were near at hand. After the sea bottom, with its deposits of gas and petroleum, had become land, the water in some places wore away the rocks until the beds of oil were exposed. In other places gas and petroleum followed little cracks in the rocks upward to the surface, in this manner showing the oil prospector where to erect his derrick and bore. To reach the oil sands some of the wells have been drilled more than a mile deep.

2. **California possesses great wealth in her forests:** The differences in rainfall over the State do not affect the farming industry as much as one would at first think. The farmer either adapts his crops to the rainfall of the region in which he lives or he joins with other farmers and organizes an irrigation district for the purpose of bringing the needed water from some mountain stream. The natural vegetation, however, cannot help itself to water and has to take what the clouds bring; and thus we find just what we expect, and that is a wonderful variation in the nature and character of the plant life between parts where it rains 80 inches yearly and parts where it rains only one to three inches.

If California were wholly a lowland plain, only the northern and coastal regions would have rain enough for forest growth. Toward the interior, shrubs and grasses would replace the trees and beyond these the country would be a true desert. But since mountains double and triple the rainfall, and California is a land of lofty mountains, we find forest belts scattered through the interior wherever the surface is high and cold enough to condense sufficient rain or snow.

Thus a forest map of California comes pretty close to being a rainfall map and tells us quite accurately whether the rainfall in any particular section is heavy or light.

Some of the deserts of the world, such as the Sahara and the deserts of South America, have no rain and are without plants, but our California deserts all get a little rain and sup-

port plants of a strange and interesting appearance which have so changed as to get along with very little moisture. Some of these plants, such as the cactuses, store up water. The Mexican creosote bush has a resinous sap which protects it from evaporation, while other plants have small leaves for the same purpose.

The valleys nearer the coast receive more rain and their vegetation is different. Flowering plants give them a brilliant appearance in the spring; the most noticeable of these flowers is the California poppy, the State flower. Besides the flowers, there are many grasses, which afford forage for stock. The Great Valley is the best example of such valleys. However, this valley is really a plain, because it is of such vast extent. Between the Rocky Mountains and the Mississippi River is another vast plain which is treeless for lack of water. We journey to southeastern Russia and find the treeless Steppes; to northern Siberia, where the plains are treeless because of the cold, or to South America, where the Pampas and Llanos are quite similar.

The Great Valley of California is a type of all these plains, and before the development of irrigation, their industries were similar. In the drier parts of the southern San Joaquin, cattle and sheep raising was once the only industry. Farther north, oats and barley were grown, still farther north wheat afforded good yields.

Only a few trees are found in the San Joaquin Valley, and these are mostly along the water courses. In the Sacramento Valley there is more rain, and parts of it are dotted with great oaks.

Let us now ascend the lofty Sierras, from the San Joaquin Valley, and see what we can learn about the forests. In the foothills we come upon groves of oak, but the trees are gnarly and of little value to the lumberman. They do, however, afford good wood which, because of the scarcity of fuel in the valleys, brings a high price.

As we go higher the rainfall increases and we at last reach an altitude where it is sufficient to support flourishing pine forests. If we had begun our investigation of California forests upon the northwest coast, we would have found them descending to the sea level, because of the heavy rainfall. If we had commenced by climbing the San Bernardino Mountains, we would have had to climb to 5000 feet (about a mile

above the sea level) before we came to forests of the same trees. In our climb of the Sierras, from the San Joaquin Valley, we shall have to go about 3000 feet before reaching pine forests (coniferous forests).



The sugar pine is the most valuable of all the California lumber trees. It is becoming scarcer every year because of fires and wasteful lumbering.

Yellow pines, sugar pines, fir and cedar of the Sierra Nevada Mountains form one of the finest forests of its kind in the world. Judging from the rainfall map, we should find a similar condition in the Klamath Mountains, the volcanic plateau region, the higher parts of the Coast Ranges, and the San Bernardino, San Gabriel and Incopah Mountains of Southern California. Incopah is a new name for the mountain range extending south from Mt. San Jacinto into Lower California.

These forests are not conveniently situated for lumbering, because they are high upon the slopes in a very rough and rugged country. It is difficult to build roads and railroads into these regions. The streams are too swift and rocky to permit floating the logs down them, as is done in the Eastern States, consequently the camps and mills are established as near as possible to the trees that are to be cut; then a flume is built from the mills down the mountains to the nearest valley railroad; this flume is filled with water and the lumber is thus floated to market.

The redwoods love the damp and sheltered valleys near the coast and are to be found from Monterey county north to the Oregon line. This valuable lumber tree grows so close to the coast that it can easily be made use of, and if greater care is not soon taken all the available trees will soon be gone. A strong effort is now being made to preserve the best groves of these giant trees in State or National parks.

The center of the redwood lumber industry is in the vicinity of Eureka, upon Humboldt bay, where are located some of the greatest saw mills in the world. Humboldt bay, although its entrance is not deep enough for the largest boats, is the third best natural harbor upon the coast of California. So great an expanse of mountains lies back of Eureka that the agricultural products shipped are small in value compared with that of the lumber.

WHAT IS THE OBJECT OF RESERVING LARGE AREAS OF THE CALIFORNIA FORESTS AS PARKS AND NATIONAL FORESTS INSTEAD OF PERMITTING THE LUMBERMEN TO CUT THEM DOWN?

The first reason is that our forests are among the wonders of the world. The giant redwoods of the Coast Ranges and the "Big Trees" of the Sierras are found nowhere else. We wish to preserve the best groves of these trees for all time, so that those who live here after us may see what Nature has done for

our State. If we destroy the best that she gave us, not only of the trees, but also of the animals, for the sake of our profit alone, we would be exceedingly selfish and deserve to lose our prosperity, as people have in other parts of the world who have done this thing.

Our forests form also one of the attractions for tourists, and it would not pay to destroy them if we thought only of the money they brought into California.

Another reason for preservation of the best of the forests in National and State parks, is that our climate favors out door life. The cool forests and the wild mountain scenery calls on us to go camping, and so breathing in strength and inspiration, we return home better able to do our work.

A third reason is that the forests upon the mountain slopes help hold back the rain water, so that it does not run off as rapidly as it would if the surface were bare. For this reason the National Government has reserved great forest areas about the headwaters of the streams. The parks are kept just as Nature made them; neither the trees, flowers, animals nor birds are allowed to be disturbed.



Artificial terracing to save what is left of the soil when the forests are gone. Wu-t'ai-shan, Shan-si Province, China.

The timber of the National Forests, where it can be cut without endangering the water supply, is open to the lumbermen under certain conditions: They must cut the trees with care; the waste material must be piled and burned, so as not to endanger the surrounding forest, and a sufficient number of trees must be left to supply the seed for a new generation of trees.

The prosperity of the California farmer and fruit grower depends upon the water supply, and if the summer flow of the stream is reduced, he is injured. Where the lumberman has cut the forest clean and fires have swept through it, there is nothing on the ground to hold back the rains and melting snows. The water runs off rapidly, carrying the best of the surface soil with it. In the summer there is less flow, because less of the water sank into the ground to feed the springs.

If we could travel to China and the countries about the Mediterranean Sea, we would be able to see how people suffer now because their ancestors were careless and destroyed the forests that once covered their mountain slopes.

Still another reason for the Government watching over the forests is that if left to greedy men they would be quickly ruined here in California, as they have been throughout much of the east. Lumber would become scarce and high priced.

By carefully cutting and replanting the forest, and at the same time guarding against fire, California can preserve her wonderful forests for all time.

HOW HAS THE LACK OF RAIN IN CERTAIN PARTS OF THE STATE MADE POSSIBLE INDUSTRIES WHICH OTHERWISE COULD NOT BE CARRIED ON?

1. The presence of beds of rock salt, soda, borax and nitrate in the deserts is due to the almost entire absence of rain. If much rain fell, the water would gather in these basins and form lakes. The salt would be dissolved in the water of the lakes, and if the water overflowed and ran away to the ocean the salts would be lost. The salt commonly called Chile saltpeter, which farmers prize so much as a fertilizer for their fields, comes from a South American desert where it never rains.

2. The growth of the raisin industry is due to hot summers and the absence of early fall rains in the San Joaquin Valley, and those valleys of southern California which are protected from ocean winds.



A field of Thompson seedless grapes near Fresno. This is the rich delta of the Kings river with its abundant water supply.

Fresno has become the center of the raisin industry, but the whole of the southern half of the San Joaquin Valley is equally well adapted to the growing and curing of the raisin grape. Once the people of the United States imported their raisins from Spain, but parts of California and Arizona have been found to produce such fine raisins that now we supply most of this fruit that is used in the United States.

3. The production of sugar beets and beans, two things for which California is noted, is determined not so much by the amount of rainfall as by the presence of damp fogs in which the coast valleys are bathed during the time of the hot weather in the interior valleys.

The weather in which beets thrive is just opposite of that required for the growing of sweet grapes and their transformation into raisins.

TO WHAT EXTENT HAS THE CHARACTER OF THE RIVERS INFLUENCED THE INDUSTRIES THAT HAVE GROWN UP IN CALIFORNIA?

If some one had asked us what we thought of mountains before we began studying geography, we would probably have said they were a nuisance; that the farmers could not use them and that they stood in the way of building roads and railroads; but as we go along, we learn more and more of their importance and how very useful they are.

To the presence of the mountains we owe our minerals; to the mountains we owe the heavy rains that produce the forests upon their slopes; to the mountains we owe the rivers that supply water for irrigation.

Another use besides irrigation has been found for the streams which dash down through the mountain canyons—that is, we have learned how to turn their power, which was once wasted, into electricity for doing all kinds of work.

If California had been settled long ago by the people who came across the ocean to New England, they would have found it very difficult to use the water power of the California rivers for turning their mills, as they did that of the streams of the Atlantic coast.

Throughout the valleys of California, the streams flow gently and afford no power for turning mills. In the southern part of the State they usually sink in their sandy beds before reaching the ocean. The rapids and waterfalls are mostly

in the remote and inaccessible mountain gorges. It would never have been profitable to build mills and factories in the mountains because of the expense of building roads and getting material in and out. The New England streams flow swiftly right down to the bays into which they empty, and so the water power was almost at the front door of the settlers of that region.

It was not until we discovered how to carry electric energy upon copper wires, for hundreds of miles, that the water power of the mountain streams could be used. Now many power plants have been built in the canyons of the Sierra Nevada mountains. Each plant requires only a few people to care for it; the copper wires carry the electricity down to the valleys where people live, and to the great cities upon the coast where it is used to do all kinds of work for us.

HOW MUCH HAS THE COAST TO DO WITH THE INDUSTRIES OF CALIFORNIA?

The fact that California has nearly 1000 miles of coast line has led to the development of industries which an inland State does not have. There is, first, fishing, which is favored by the submarine shelf which extends out to the islands. The shallow waters of this shelf afford immense numbers of food fish a congenial home. Since there are few harbors and abundant opportunities for work on land, not so many of the inhabitants become sailors as is the case in a land such as New England, which has a rocky soil unfavorable to farming, and innumerable bays which encourage life upon the water. The larger number of the sailors who voyage to and from our shores are foreigners; most of the fishermen are also foreigners. Why are they mostly Greeks, Portuguese and Italians?

HAS THE FACT THAT CALIFORNIA IS FROM TWO TO THREE THOUSAND MILES FROM THE CENTERS OF INDUSTRY OF OUR COUNTRY HAD ANY INFLUENCE UPON THE GROWTH OF ITS INDUSTRIES?

For many years after the discovery of gold, and down to the completion of the Central Pacific Railroad, in 1867, all the manufactured goods for use in California had to come either by way of the Isthmus of Panama or around Cape Horn. After the building of the railroads, supplies of needed articles were easier to get, but the freight made them cost much more, especially heavy goods.

This condition tended to make Californians depend upon themselves as much as possible and encouraged manufacturing industries of many kinds. But since there was little water power accessible, and coal was high priced, manufacturing has only recently begun to assume great importance. What conditions at present favor manufacturing and are causing the building of many factories?

**ARE THERE ANY INDUSTRIES THAT HAVE SPRUNG UP
INDEPENDENT OF GEOGRAPHICAL REASONS?**

1. The fruit canning industry has become more important than anywhere else in the world. The growth of this industry can be partly accounted for by geographical reasons. If California had clustered about it the many millions of people who live in the Eastern and Central States, there would be a much better market for fresh fruit than there is at present. The people of California can eat only a small part of the fresh fruit that is grown here, and it is very expensive to ship it east in refrigerator cars, consequently the canning industry has grown up in an attempt to save the fruit that can not be eaten or dried. In sealed cans the fruit will keep a long time and can be shipped to distant parts of the world.

The miners of California had to invent the machinery they required to crush the ores and separate the metals from them. California mining machinery has become noted all over the world where gold mining is carried on. The San Francisco bay region is the headquarters for this industry.

2. Shipbuilding developed early on San Francisco bay because of the great extent of quiet water and the nearness to the forests of spruce and pine. Iron and steel are used so much in the making of modern ships that another port farther from the lumber supply has become a shipbuilding center—San Pedro, the new port of Los Angeles, is now engaged in building large ships.

CHAPTER 3.

WHY IS IT THAT IN SPITE OF SOME DISADVANTAGES OF LIVING IN CALIFORNIA, PEOPLE NEVERTHELESS THINK THE ADVANTAGES OUTWEIGH THEM, AND EVER SINCE THE BUILDING OF RAILROADS HAVE COME HERE IN INCREASING NUMBERS?

A. Disadvantages of Life in California.

1. Earthquakes frequently occur and some of these have been very destructive. Mission San Juan Capistrano was destroyed by an earthquake more than 100 years ago. The earthquake of 1906 was the most destructive of any since the settlement of the State. For a distance of 200 miles through the central Coast Ranges a fissure was formed, and along this the earth slipped. The water mains of San Francisco were broken and a large part of the city was destroyed by fire.

But if we put up strong buildings, we need have little fear of earthquakes. They are really a blessing in disguise,



This is a scene upon the great earthquake rift in the Coast Ranges north of San Francisco. The great earthquake of 1906 left a track in many places like that of a giant plow.

for they have had to do with movements of the earth which have given us mountains. The Sierra Nevada range is a great block of the earth raised to its present position during repeated earthquake movements. If there had been no earthquakes we would have had few lofty mountains. Without mountains, there would have been no rivers of any size to supply water for irrigation. The most of California would always have remained a thinly settled, half desert region.

2. California is a long distance from that portion of the United States containing most of the people and the centers of trade and industry. It takes four days of continuous travel on a fast train to reach Washington, the capitol of our country. It took the Pony Express eight days to reach California from the Mississippi river. The emigrant with the ox team took three months for the same journey. The hardships of the journey were increased by the fact that much of the distance was over mountains and deserts.

3. The chief market for fresh fruit and vegetables is two to three thousand miles distant. This necessitates specially prepared refrigerator cars in order that the perishable products may reach their destination in a fresh condition. This adds to the shipping expenses and leaves less profit for the California fruit grower.

4. The larger part of the manufactured goods, of almost every description, used here is made in the east. Shipping them so far adds much to their cost. Very heavy, bulky articles are often shipped by water. This once required a very long voyage, but since the building of the Panama Canal, the water route has been much shortened.

5. Compare Imperial Valley (Colorado Desert), as it is today, with the present Mohave Desert.

6. The coast has few good harbors. The narratives of the early navigators who first sailed along the California coast tell us that they could find no good safe harbors in which to stop.

7. Study the map and you will discover how regular the shore line is. Compare it with that of British Columbia and New England. If our ancestors who came across the Atlantic ocean and settled in New England had found a coast like that of California, how do you think they would have fared? Read the stories of the early Spanish navigators and you will be able to appreciate how difficult and dangerous the California coast appeared long ago.

The California coast is bordered by mountain ranges, which in most places rise quite abruptly from the shore. The navigable bays we have, such as Humboldt, San Francisco, San Pedro and San Diego, were formed by the sinking of the land. San Francisco bay is the best example of a great inland body of water, being formed by the sinking of the land and the flooding of the lower Sacramento River Valley. The formation of the smaller bays mentioned was aided by the waves throwing up barrier beaches or bars in front of them.

The New England coast is also a sunken one, but the surface of the land was broken by so many streams between which were rocky ridges that many deep bays were formed.

B. The Advantages and Attractions Possessed by California.

1. The climate of California is healthful. Except for some of the desert valleys, it is not uncomfortably warm, and except for the high mountains and plateaus it is not disagreeably cold. The climate of most of the lowland valleys is mild and pleasant throughout the year, and although the winters are cold and snowy in the mountain valleys, the greater part of the year is delightful.

Because of the ocean winds the temperature near the coast varies but little. Southern California is noted for its pleasant winter climate, and that is one of the reasons it is visited by thousands of tourists. During the summer the beaches between San Francisco and San Diego are dotted with people. Upon a warm day we can find perhaps one hundred thousand people upon the beaches within reach of Los Angeles.

2. Except in the mountains, there are no long cold winters. In all the States lying to the east and northeast of California, the winters are long and often very cold. In all this region livestock has to be kept in barns and fed for about six months. During this period the farmer can do but little work out of doors. Over all of California, except in the mountains, the winter is so mild that work is not interfered with, and cattle can graze. We see that in the case of California latitude has little to do with the climate, but that the influence of ocean winds and the mountains has been very great.

3. The scenery of California is very attractive. There is so much that is interesting and beautiful within the boundaries of the State that it would be a great undertaking to see it all.

There are lofty, picturesque mountain ranges, such as the Sierra Nevada, San Bernardino and Klamath mountains.

There are great extinct volcanoes, such as Shasta; Mount Lassen is still active and in its neighborhood are cinder cones, rugged flows of lava and boiling springs. There are deep



The Kings river flows a large stream all summer because it rises among the highest mountains of California where heavy snows fall.

canyons, such as the Yosemite and Kings River, noted far and wide for their wonderful cliffs and waterfalls. There are many hundreds of beautiful glacial lakes in the Sierra Nevada mountains, overhung by cliffs and banks of perpetual snow. There are other alkaline lakes, such as Mono and Owens, lying in desert basins. There are great trees, such as the redwoods in the Coast Ranges and the "Big Trees" in the Sierras. Some of these are three to four thousand years old. Since the mountains lie close to the ocean along most of the coast, the shore is rocky and picturesque. There are many mineral springs, the waters of which have medicinal properties.

4. Great differences of climate within a few miles add to the attractiveness of the land.

No matter where your home is, whether in a hot valley, upon a mountain side, where the winters are cold, or upon the cool foggy coast, a journey of only a few miles will bring you to a climate that is very different. Thus the dwellers in all of these three regions can have a change of climate, with very little effort or expense. They can get a change which would require a journey of a thousand miles in many parts of the world. Nowhere else are conditions more favorable for outdoor life. Californians should grow up strong and healthy. The long dry summers make mountaineering very much more pleasant than in the Alps, where it rains nearly every day, and no one ever thinks of sleeping out of doors.

5. California has few severe storms and no tornadoes or hurricanes. We often read in the newspapers of destructive tornadoes which sweep across the States of the Mississippi Valley. The Southern States are sometimes visited by hurricanes which start in the West Indies Islands. These storms are similar to the little dust whirls that we have all seen moving across the fields picking up light articles in their courses, only that they are much larger and more powerful. The rains which visit California in the winter come with very large whirls, usually many hundreds of miles across. The wind in these storms does not blow very hard and seldom does damage.

The thunder storms, which occur mostly in the mountains, in the summer, are rather alarming at times, but aside from the forest fires, which they sometimes start, they do very little harm and much good, because the torrents of rain go to swell the streams at a time when water is most needed for irrigation.

During the spring and fall there is occasionally, in south-

ern California, a dry desert wind called the "Santa Ana." This fills the air with a cloud of dust and is not only very disagreeable, but injures tender plants.

6. California has a climate which makes irrigation necessary. Many of us have come to California from some one of the Eastern States, where there are summer rains and irrigation is not practiced. When we saw the amount of work that had to be done to water the crops where there was no summer rain, we thought the people who had to farm in such a country were to be pitied. It did not take us long to learn better. The story of how people first learned to farm tells us that the earliest farmers, and those who were most successful, were those who lived in the lands where so little rain fell that irrigation had to be depended on. Among these people were the farmers of Egypt, Mesopotamia and China.

The Spaniards who first settled in California found here a climate like that to which they were accustomed in their old home in Spain. Spain borders the Mediterranean Sea and all the countries around this sea have much the same climate. For this reason the name of the sea has been given to their climate. California has, then, a Mediterranean climate.



A method of irrigation called "irrigating by squares." The water is held in the squares by little ridges of earth until the ground is thoroughly soaked.

It is very easy to see the advantages of irrigation—and there are many. By using irrigation, water can be turned on the garden, orchard, grain field or alfalfa field, just when it is needed.

In the Eastern States, where summer rains are usually sufficient, there are seasons when there is too much and the crops are killed; there are other years when there is not enough rain and the crops dry up. In a region where the growing season is long, as in California, irrigation enables one to grow several crops in a year, where, without it, only one, at most, could be produced.

It took the emigrants from the Eastern States a long time to learn what a wonderful State this is. They thought at first that the valleys which become so dry and parched in summer were worthless for the farmer, and so used them only as pastures; then they discovered that grain would grow, if



This is the bottom of the canon of the Colorado in which it is planned to build the greatest dam in the world to hold water for irrigating the desert regions of California and Arizona.

land along this river, and although Shasta Valley can be watered from it, mountains in the way make it impossible to turn its waters southward to the Sacramento Valley.

The Sacramento and San Joaquin rivers, getting their waters from many tributaries, chiefly from the high Sierras, supply the Great Valley. We cannot imagine rivers more favorably situated for the purpose of irrigation than are these. Trace the two main rivers mentioned and explain why there are so few tributaries from the Coast Ranges. Large areas, particularly on the western side of the San Joaquin Valley, are still uncultivated for the lack of water. In the spring there are, however, often serious floods in the Sacramento River Valley, and an enormous quantity of water runs away to the ocean through San Francisco Bay. When sufficient reservoirs have been made in the mountains to hold back the flood waters and save them for summer use, the farmers will be benefited in two ways: the rich overflow delta lands along the Sacramento river will be made dry enough for cultivation and the forest lands of the San Joaquin Valley can be supplied with water.

Southern California is more poorly supplied with water than northern California, partly because there is less rain and partly because of the smaller extent of lofty mountains.



This is a scene upon the delta of the Sacramento river. The cultivation of the rich soil has been made possible by dikes or levees which protect it from overflow.

Because of the peculiar attractiveness of its scenery and climate, Southern California is increasing in population very rapidly. From where will come the water to supply its cities,



Los Angeles Aqueduct crossing a desert valley. Note how heavy and strong the pipe is in order to withstand the pressure of the water.

orchards and gardens? The Tejuanga and San Gabriel rivers supply the Los Angeles region, while the Santa Ana river affords water for the fertile valley through which it flows. The Santa Ana is the largest river of southern California and rises on the slopes of the San Gorgonia and San Bernardino, the two highest peaks.

During particularly wet winters the streams of southern California carry an immense quantity of water away to the ocean, unused. It will be necessary to build many great reservoirs to hold this water.

When Los Angeles outgrew its water supply from the Los Angeles-Tejuanga river, other sources were looked for. The only possible stream that could be brought to southern California was Owens river, at the eastern base of the Sierra Nevada mountains. This river is supplied by melting snows of this lofty range, and only a part of it was used by the farmers scattered along its valley; consequently Los Angeles built an aqueduct 250 miles long and brought Owens river across the Mohave Desert and through the mountains. Now there is water not only for the needs of the city but also for the irrigation of thousands of acres of rich land in the San Fernando Valley.

The Colorado is the greatest river that touches California, and the last one to be made use of. For years after the settlement of California, this river flowed through the Colorado Desert and no one thought of attempting to turn its waters on to the rich but parched soil. A portion of the desert, Imperial Valley, has now been transformed into one of the most productive of the State, by irrigation.

WHY ARE THE STREAMS OF THE COAST RANGES OF SO LITTLE VALUE FOR IRRIGATION, ALTHOUGH MOST OF THE REGION RECEIVES A GOOD RAINFALL?

We give the name "Coast Ranges" to the mountains between the Great Valley and the ocean. They extend from the Klamath mountains on the north to the San Emedio mountains at the southern end of the San Joaquin Valley. The greater part of the Coast Ranges do not rise over three to four thousand feet. Because they are not high and cold enough, most of the moisture comes as rain, while in the Sierras it is mostly snow. The winter and spring rains run off quickly in floods, leaving the streams low, and in many cases almost dry in summer, when their water is needed for irrigation.

planted early enough, and finally that, with water, taken from some nearby stream, they could raise almost anything.

7. California has sufficient water, when it is properly stored, to irrigate nearly all her rich valleys. The ocean winds bring the clouds, the mountains help to condense the moisture into rain and snow. The rivers bear the water to the valleys, where the thirsty land awaits it; but if it were not for irrigation the rivers would flow on to the ocean, moistening only their immediate banks. In the drier valleys of California, trees grow naturally only along the banks of the rivers.

Some half-desert lands as well as real deserts are without water for irrigation. If they have a little rain, there will be vegetation in the spring, and stock can be pastured on them for a few weeks.

California has many rivers, and though only the San Joaquin and Sacramento are large enough for navigation, yet they serve both for generating electricity and for irrigation.

ALTHOUGH CALIFORNIA HAS ABUNDANT WATER FOR IRRIGATION, HAS THIS WATER, IN ALL CASES, BEEN DISTRIBUTED BY NATURE WHERE IT IS WANTED MOST?

One of the largest rivers which has nearly all of its course in California is the Klamath, but no other is so unfavorably situated for use in irrigation. This river rises in southern Oregon, but practically all its course is through the steep and rugged Klamath mountains to the ocean.

The Salinas river has the largest basin of any stream in the Coast Ranges, but except for a few months its bed is for miles completely dry. What water there is, is flowing deep down through the sand. Water is much needed in the basin of this river, but reservoirs will have to be built before much irrigation can be carried on.

The Eel and Trinity rivers, in the northern Coast Range, flow for the greater part of their courses through a mountainous country, and there is little land along their courses that farmers can use.

The Colorado river is the greatest one that touches California and the last one to be made use of. For many years no one thought seriously of attempting to turn its waters upon the parched desert through which it flows, notwithstanding the fact that one of its ancient channels across the delta runs directly through what we now know as Imperial Valley. But

the river was at last turned onto the desert, with surprising results. The mild winters and warm sun of early spring made the rich delta soil return the farmers' effort with abundance. Early spring vegetables, canteloupes, lettuce and grapes are now shipped in immense quantities to all parts of the country. The date palm appears to be as much at home here as in the oases of the Sahara Desert, or the frightful heat of the Persian Gulf.

The present canals which supply Imperial Valley cannot reach all the desert. It is now planned to build the greatest dam in the world, far up in the canyon of the Colorado river. From this dam the water will be taken and carried in an aqueduct at so high a level that it will be possible to irrigate a vast area in Southern California which is still an uninhabited waste. This will about double the present area of possible farm land in the southern part of the State, and enable it to support several times its present population.

CHAPTER 4.

HOW CAN WE ACCOUNT FOR THE FACT THAT THE INDUSTRIES OF CALIFORNIA HAVE CHANGED AS THE STATE HAS GROWN IN POPULATION AND IMPORTANCE?

During the Spanish occupation, the chief products that were shipped away were hides and tallow. Little other use was made of the cattle that roamed the great ranches.

The discovery of gold made mining the chief industry for many years. With the increase in population, more land became cultivated and wheat was perhaps the most important crop. As mining declined, stockraising and general farming took its place. Then the advantages of irrigation began to be better understood. A mild climate, rich soil and an abundance of water led to the planting of orchards, but these did not become of great importance commercially until the State was connected with the eastern market by means of railroads, and the refrigerator car had been invented.

We can see at every step how the industries of California have been affected by the possibility of reaching a market. There was no use of growing more than could be consumed at home, unless it could be disposed of.

As fruit growing increased, cattle raising and wheat growing decreased to such an extent that now California does not raise all the beef, pork and wheat that it uses. The farmers of the San Joaquin Valley and Sacramento Valley neglected to fertilize their fields, so that they no longer obtained good yields of wheat, while the fencing of the land and its use for other purposes limited the range of cattle.

There was once little dairying in California, for the market was small. The growth of cities and towns opened a market, and improved methods made the industry more profitable. Dairying was then mostly confined to the cool coast slopes and the mountain valleys, where the industry could be carried on without ice, and the grass afforded forage. Now dairying flourishes in the interior valleys; this has been made possible

because of the cheap alfalfa raised by means of irrigation, and the use of ice and refrigerators.

With the exception of that from the Southern States, all of our rice once came from Asia, chiefly Japan and China. Finally some one tried growing it on the rich bottom land of the Sacramento Valley, where there was an abundance of water; it was a great success and we now raise rice for export.

Cotton needs a long season and hot sun, but less water than rice. Someone tried growing it in the Imperial Valley and it was a success, and thousands of acres have since been planted there. It will also probably be a success in the San Joaquin Valley.



The farthest north cotton field in the United States,
Near Chico, California.

The climate of Imperial and Coachella Valleys is much like that of the oases in the Sahara Desert, where the date palm thrives. Date palms were planted in these valleys, and are now proving the suitability of the climate and soil by bearing valuable crops of fruit. California may some day become as noted for its dates as it is now for its oranges.

The orchards of semi-tropical fruits, such as the orange, lemon, fig and olive, and vineyards of the raisin grape, now distinguish California but little more than its orchards of temperate fruits, such as the apple, prune, pear and peach. All these fruits are grown together under the same conditions in Southern California and the Great Valley, but the temperate fruits particularly characterize the valleys of the Coast Ranges, in most of which it is too cool for the orange.

The latest industry to become prominent in California is the oil industry, the State being now one of the greatest producing centers in the world. This industry, however, like placer mining, will not be a permanent one, for the time will come, in a few years, when most of the available petroleum will have been taken from the earth.

CHAPTER 5.

WAS IT THE DISTANCE TO CALIFORNIA THAT MADE IT SO DIFFICULT TO REACH IN THE EARLY DAYS, OR WAS IT RATHER THE NATURE OF THE COUNTRY THAT HAD TO BE CROSSED BEFORE THE FERTILE COAST VALLEYS COULD BE REACHED?

No important valley in the United States is so isolated by Nature as the Great Valley and coastal valleys of California. It seems as though Nature had made California difficult to reach in order that people should prize it more when they had gotten here.

In exploring a new country, rivers and lakes usually offer a great help. Think of the assistance to the early explorers of the continent, which was offered by the Great Lakes, the Ohio and Mississippi rivers.

Of course, one could take the ocean route to California, but even that was, for people living in the Eastern States, a long and dangerous undertaking before the use of steamers and before the building of the Panama canal.

Not one of the three trails across the continent to California that was opened by the pioneers made use of lakes or rivers. If you will look at the map, you will discover the Missouri river is the only navigable stream flowing from the west into the Mississippi. It rises far in the northwest and could not be made use of by the emigrant bound for California.

The prairie region east of the Mississippi river had become fairly well settled when the gold rush to California began, but west of the river the country was a wilderness. The journey across the Great Plains, which rise gradually from the Mississippi river to the foot of the Rocky mountains, was not difficult or dangerous except for the Indians.

There is only one gap or low pass in the Rocky mountains which form the backbone of North America from Mexico to Alaska. This is known as South Pass and happened to lie on the direct route to California. After crossing the mountains, the pioneers came to a desert. This is known now as the Great Basin, because it is so rimmed about by higher land that

no rain that falls upon it ever runs away to the ocean. The water which collects in the desert basin is filled with salt and alkali. The pioneers came first to Great Salt Lake and then, before finishing the desert, passed near Pyramid, Humboldt and Winnemucca lakes, in what is now Nevada. The lack of forage and water, together with the hot summer sun made this desert basin a terrible land to cross. When they had successfully passed through the desert, the pioneers came to the Sierra Nevada Mountains, which stretched across their path, as a great rocky wall, for 400 miles. They could not go round these mountains and so succeeded with great difficulty in crossing them by way of several passes, the most commonly used being Donner Pass.

Descending the western slope of the mountains, the travelers found themselves in the Great Valley, and ended their journey at Sacramento.

The pioneers who came to California by way of Oregon did not have to cross the Great Basin, but turned toward the north from South Pass and followed down the Snake and Columbia rivers. Frequent rapids interfered with navigation upon these rivers. After reaching the lower Columbia river, there still remained many difficulties before getting to the Sacramento Valley. The Siskiyou and Klamath mountains had to



Indian wigwams consist of a framework of poles upon which are laid skins of animals, or sometimes the bark of trees

be crossed on the direct route to the valley. Another route entered California from Oregon across the volcanic plateau in the northeastern corner of the State, but this was equally difficult.

The old Santa Fe trail, by way of New Mexico and Arizona, crossed the Colorado river at Fort Yuma, and then branched. One way led across the Colorado desert to San Diego; the other northwest through the Colorado and Coachella deserts by way of the San Gorgonio Pass to San Bernardino and Los Angeles. The deserts of this route, however, were more to be dreaded than those farther north and, in addition, there were the Apaches and other Indians lying in wait. The San Gorgonio is the only open and easy pass from the East to the coastal slopes of California. This pass is only 2,000 feet high and lies between the two mighty sentinels, San Gorgonio and San Jacinto peaks. No other pass to the coast is less than 4,000 feet, and the one most used, Donner Pass, is over 6,000 feet in height.

HOW IS IT THAT THE MOUNTAINS AND DESERT ARE NOT NOW SUCH DREADED BARRIERS AS THEY WERE ONCE?

The pioneers had to make their own roads over the mountains. They had to be on the watch for water while crossing the deserts. We can now cross the 2,000 miles between California and the Mississippi river in comfort, either upon the cars or in automobile. Graded roads have been built over the mountains, and signs have been posted along the desert roads telling where the springs are. The Lincoln Highway, built along the line of the old emigrant trail through South Pass, by Great Salt Lake, across the Carson desert and over Donner Pass, presents a very different appearance now, with its swiftly traveling automobiles, than it did sixty years ago, with its slow-moving ox teams.

HOW IS IT THAT THE MOUNTAINS AND DESERTS BETWEEN CALIFORNIA AND THE MISSISSIPPI RIVER ARE NOT NOW THE LONESOME WASTES, PEOPLED ONLY BY INDIANS, THAT THEY WERE ONCE?

The discovery of gold in California led to the search for the precious metals in the Rocky Mountains. Gold, silver, lead, zinc and copper were found not only in the Rocky Mountains but in the desert ranges of Nevada and eastern California. In

time quite large settlements grew up about many of the mines. In the mountains, wood and water were plentiful; in the desert ranges water often had to be piped many miles.

Upon the eastern and western sides of the Great Basin are lofty mountains. These mountains send down living streams, which once sank uselessly into the desert sands, or formed alkaline lakes. The waters of all these streams are now being utilized by farmers and stockmen, who have taken up ranches along their courses. Thus the water of the Wasatch range in eastern Utah, with man's help, have made a garden of the desert which lay between it and the Great Salt Lake. Upon the western side of Nevada, the Truckee river, which once emptied in Pyramid lake, is now held back by a great dam, which forms a huge reservoir. From this reservoir, the water is conducted in ditches over many thousands of acres of the once dreaded Carson desert.

WHY IS IT THAT IN MOST CASES THE RAILROADS HAVE FOLLOWED THE ROUTES OF THE PIONEERS' WAGON ROADS INTO CALIFORNIA?

The pioneer explorer hunted out the passes in the mountains, where they could get their wagons through with the least trouble. We would naturally expect the railroad engineer would do the same.

The most direct road, and that most used from the East to Sacramento, was by way of Great Salt Lake, Carson Sink and Donner Pass. This was known as the Salt Lake route, but now it is called the Lincoln Highway. The height of Donner Pass, 6,000 feet, is a great disadvantage, for the winter snows are deep and block the road for about six months every year. The Central Pacific, the first railroad built to California from the East, followed the Salt Lake trail through Donner Pass, and down to Sacramento. In order to keep the road open through the winter, many miles of snow sheds were built.

The next road to be built across the mountains to the coastal valleys, was the Southern Pacific. This road entered the southeastern corner of the State at Fort Yuma. It escaped the mountains, which the northern railroads had to cross, but it ran through long stretches of desert in Texas, New Mexico, Arizona and California. This route is across the Salton Sink, and when the Colorado river flooded the sink and made Salton Lake, the railroad had to be moved to higher ground. The San

Gorgonio Pass, through which the Southern Pacific runs, is so low (2,000), and has such a gentle approach upon each side that it gives this line an advantage over all the others that compete for Southern California trade.

The third railroad came into California from Oregon. This road was difficult to build, for it passed through a very mountainous country. It crosses the Siskiyou mountains on the Oregon boundary; then winding through Shasta Valley and close under Mt. Shasta, it strikes the head of the Sacramento river and follows its wild and picturesque canyon down to the Sacramento Valley. This canyon is so difficult for a wagon road that the first one connecting Oregon and California turned toward the west from Shasta Valley and climbed over the Scott's and Trinity mountains.

The fourth railroad into California was the Santa Fe which after crossing the plateau of northern New Mexico and Arizona, entered the State at the Needles, on the Colorado river. It then traversed the broad Mohave Valley and entered Southern California through the Cajon Pass, which has an elevation of 4000 feet.

Later, the Salt Lake Railroad made use of the same pass to reach Southern California. This road follows in a general way the old Mormon trail to California across southern Utah and Nevada.

The Western Pacific Railroad entered Northern California through Beckwith Pass. This is a low point in the Sierras, with an elevation of only 4,000 feet. But after passing through this gap, the only practical route to the Sacramento Valley was found to be through the canyon of the Feather river. This route is picturesque and very difficult to build a railroad through. Beckwith Pass was little used by the emigrants to California, because of the rugged mountains and canyons which lay between it and Sacramento Valley.

There are unused mountain passes through which still other railroads can reach the coast. It is probable that the Volcanic Plateau, in the northern part of California, will sometime be crossed by a railroad from Oregon to the Sacramento Valley. The broad valleys upon the plateau are capable of supporting a great many people, but are thinly settled because of the remoteness from markets and the difficulty of getting there.

South of Lake Tahoe is another gap called Carson Pass,

the wagon road through which leads down to Placerville. This would not be a difficult route for a railroad.

Near the southern end of the Sierra Nevada Mountains is Walker Pass, having an elevation of 4,000 feet. The approach to this Pass is easy, but in descending the western slope of the mountains the canyon of the Kern river offers as great difficulties as the canyon of the Feather river did to the Western Pacific.

A railroad has been built from Imperial across the Inco-pah range and close to the line of Lower California. This gives San Diego a direct connection eastward. Although the railroad attains an elevation of only 4,000 feet, the region was found difficult to build through.

WHY IS IT THAT IN SPITE OF ITS ABUNDANCE OF RAIN THE NORTHERN COAST REGION AND KLAMATH MOUNTAINS ARE VERY THINLY SETTLED?

We have learned how much railroads and good roads mean to the industries of California. Let us find out why the northwestern corner has no railroads. We learn from the map that the whole of this region appears to be a mass of mountains, with only two or three valleys of any size. We conclude that it is very rough, and as the rainfall is heavy that it must be forested. The roughness of the surface forbids the idea of farming, but suggests cattle and sheep raising. The streams in the Klamath mountains, especially the Klamath and Trinity rivers, and their tributaries, like those of the Sierras, were found to be rich in placer gold, but most of the gold was taken out years ago.

The map shows that the region is separated on the land side, by mountains, from the rest of the State, but fortunately can be reached by way of the ocean. It appears that lumbering must be the chief industry at present, and that Humboldt bay is the only outlet, excepting Crescent City.

As the streams are not navigable, lumbering must at present be confined to the part near the coast.

So rough are the Klamath mountains that no wagon road has been built across them from the coast to the railroad in Shasta and Sacramento Valleys. There is now a wagon road across the Coast Ranges, which joins the Klamath mountains on the south. This road starts at Eureka and ends at Red Bluff. Until recently, if one wished to make the journey be-

tween these two places by road, he would have had to go around by San Francisco bay, or way north into Oregon. A railroad now connects San Francisco bay with Eureka, and it is likely it will some day be extended north along the coast into Oregon.

HOW HAVE MEN BROKEN DOWN THE BARRIER WHICH NATURE PLACED BETWEEN NORTHERN AND SOUTHERN CALIFORNIA AS THOUGH SHE INTENDED THE TWO REGIONS TO BE SEPARATE STATES?

To the south of the central part of California, an arm of the Great Basin, which we call the Mohave Desert, extends westward until it almost cuts the State into two parts, a group of rugged mountains being the only barrier between it and the coast. Before there were roads, a journey by land from Los Angeles to San Francisco was a very difficult one.

By the interior route, one had to go over two mountain ranges and either across the Mohave Desert along the route of the Southern Pacific Railroad, or skirt its western end. We have all heard of the difficulty of building the railroad over the Tehachapi Pass, between Mohave and Bakersfield. The Tejon Pass through which the State Highway goes, is as high as Tehachapi's, but not so difficult.

The coast route takes one through long valleys and across several mountain ranges. Between Santa Barbara and Ventura, the rugged mountains come down so close to the ocean that the road descends to the beach, and years ago was not passable at high tide.

Railroads by both the coast and interior routes now connect Northern and Southern California. Each route has its advantages, but the coast route is pleasanter in summer and has beautiful views of the ocean. One of the most picturesque automobile roads in California now connects Los Angeles with Bakersfield. It is known as the Ridge route and offers wonderful views.

WHY IS IT THAT PEOPLE HAVE NOT SETTLED ALL PARTS OF CALIFORNIA ALIKE, SOME PORTIONS BEING ALMOST UNINHABITED, WHILE IN OTHERS THE POPULATION IS VERY DENSE?

If the surface of California was as uniform and the climate was as much alike over great areas, as they are on the prairies of the Mississippi Valley, people would be quite evenly distributed over the State. We have already learned

how broken the surface is, and how greatly the climate varies within a distance of a few miles, and we know that these things influence people in their choice of homes.

There is little except mining to induce people to live in the high mountains or on the deserts.

The stockman has retreated into the remote and rough districts, because the fertile valley land is too valuable to use as pasture for cattle. Each stock ranch requires thousands of acres, so that wherever this industry is carried on, the population is very scattered.

The valley lands, where there is either sufficient rain or water for irrigation, becomes thickly settled, because the soil is so productive. The valley lands are also likely to be traversed by navigable rivers, or by roads and railroads which make it an easy matter to get produce to market.

The coast attracts people, because before the building of roads it was easier to travel on the sea than on the land. That people do not settle evenly along a coast is shown by the coast of Monterey county, where for a distance of seventy-five miles the shore is so rocky, and the Santa Lucia range rises so steeply, that only a few families find room there. People gather where there are bays to afford protection for those engaged in fishing, protection for the trading vessels, and an opportunity to reach the interior valley, perhaps, by rivers that flow into the bays.

CHAPTER 6.

JUDGING FROM THE CHARACTER OF THE COAST AND THE NATURE OF THE SURFACE OF CALIFORNIA, WHERE OUGHT THE CENTERS OF TRADE AND INDUSTRY GROW UP?

A. If we knew nothing about the region we are studying except what we could learn from a physical map, would we not say that the centers of trade and industry ought to be upon San Francisco bay? The following are the reasons for this conclusion:

1. Using a physical map, draw a line about the boundaries of the basin of the Sacramento and San Joaquin rivers and include also the basin of all the other streams which enter San Francisco bay and flow into the ocean through the Golden Gate. This line will be found to take in about half of the State. The people of the Sacramento-San Joaquin Valley, together with those of the surrounding mountain slopes, and of the Coast Range valleys that open to San Francisco bay, would naturally send their produce to the bay regions and receive from it the things they need.

2. The Great Valley is the largest, richest and best watered valley in Western America. It is capable of supporting many, if not more people than all the rest of the State. Some day it will have a population of many millions.

3. San Francisco bay is the largest and penetrates more deeply into the land than any other bay upon the California coast. Deep water ships can pass up the bay through the Coast Ranges, and load or unload their cargoes upon the very border of the Great Valley.

4. San Francisco bay lies at the mouth of other fertile valleys besides the Great Valley. These are Napa valley, Santa Rosa-Russian river valley, Santa Clara valley, San Ramon and Livermore valleys. There is room upon the shores of the bay for all sorts of manufacturing plants which use our own products as well as the products of foreign lands.

5. One of the main lines of railroad communication with the Eastern States begins at Sacramento, where navigation

for boats of any size upon the Sacramento river ceases. Foreign goods can be trans-shipped from boats upon the bay and go direct to their eastern destination. The only disadvantage of the route east is the climb over the summit of the Sierra Nevada mountains, but it is proposed to remedy this by boring a tunnel through the range below the snow line.

B. The physical map indicates that there should be another center of trade and industry in Southern California, but it does not tell us clearly where it ought to be. There is no bay here like that of San Francisco. Let us examine San Diego bay, which is next to that of San Francisco, in its natural advantages. Although the waters are deep enough for the largest boats, this bay has the disadvantage of being at the extreme southern end of the State and of having back of it a rugged mountain range, instead of an opening into the interior.

Santa Monica bay appears to be too open and exposed to storms to become an important port. San Pedro bay is also open, and its inner harbor is naturally small and shallow.

But what of the Colorado river and the Gulf of Lower California? Why do not these waterways offer a fine outlet for the trade of Southern California, and especially for that of the Imperial valley, which is now one of the most prized sections?

To understand why none of the produce of Southern California is exported by way of the Gulf, we must know something about it and the Colorado river. The river is not navigable for any but the smallest flat bottomed boats, for its shallow channel is marked by ever changing sand bars.

The head of the Gulf of California lies in Mexican territory, but this would not be as much of an objection as the fact that the shores are low and marshy and the water is very shallow. The tide sweeps in and out for a long distance.

The region about the head of the Gulf is still an uninhabited waste, traversed only by an occasional Indian. It has recently been proposed, however, to build a railroad southward across the Colorado delta to the Gulf and establish a shipping port there. It is believed that part of the Imperial valley extending south from California to the Gulf will become the largest cotton fields in the world. Cotton could be cheaply exported by water. Such products as now distinguish Imperial valley, cantaloupes, early fruits and vegetables, would

find no market down in the west coast region of Mexico. Why?

We shall have to look inland to find the metropolis and trade center of Southern California, for two reasons: The first is that there is no good natural harbor centrally situated, with easy communication into the interior. The second is, that in a land of light rainfall water is of more importance than good harbors.

The streams of Southern California have the curious habit of being smaller, in the summer, at their mouths than they are back in the mountains where they rise. This is because most of them, after leaving the mountain, flow for miles over sandy beds before reaching the ocean. A part of the water sinks in the sand and flows out of sight and a part of it is evaporated by the hot sun.

Because there were no flowing streams near the coast, Los Angeles, now the largest city upon the Pacific Coast, was founded sixteen miles from the ocean, at a place where a stream of living water comes out of the hills on to a broad and fertile plain.

As it happened, the Presidio of Los Angeles proved to have a most remarkably favorable situation for trade, being at the meeting point of trails, which later became roads, and finally railroads. This was not an accidental meeting point, but was determined by the position of the surrounding mountains and valleys.

Los Angeles has spread towards the ocean and, feeling the need of a harbor, has taken in the little port of San Pedro, and by deepening and enlarging the inner harbor, and building a breakwater across the outer harbor, has become a seaport of very great importance.

HOW IS IT THAT MONTEREY AND HUMBOLDT BAYS, THOUGH THE OUTLETS FOR FLOURISHING INDUSTRIES, CAN NEVER COMPETE WITH SAN FRANCISCO BAY AND HARBOR OF LOS ANGELES?

Monterey is an open bay exposed to northwest storms,—moreover, there is no direct opening from this bay across the Coast Ranges to the Great Valley. The only easy route to the interior is by way of San Francisco bay, though Pacheco Pass may some time be the outlet for a railroad from the San Joaquin Valley. Carmelo bay, to the south of Monterey, is the most picturesque and attractive outing region on the Coast of California.

Humboldt bay has behind it fifty miles of rugged mountains, separating it from the Sacramento valley. Its traffic will remain purely local unless the railroad, which now reaches it, should be extended northward into Oregon. Large boats cannot enter the bay, and the bar is sometimes dangerous in storms.

**WHERE DOES GEOGRAPHY TEACH US TO LOOK FOR THE
TRADE AND INDUSTRIAL CENTER OF THE GREAT
VALLEY?**

We can answer this question by finding the meeting point of the highways that traverse the valley. Where does the physical map tell us that this center ought to be? The overland trail, by which most of the early emigrants entered California, goes over the Sierras through Donner Pass, and down the western slope to the Sacramento river at the point where the American river joins it. Here the road split up; some of the immigrants went to the Northern Mines in the foothills of the Sacramento valley, and some went south into the San Joaquin valley and the Southern Mines. Others went down the Sacramento river to San Francisco.

Those who came by water to California landed at San Francisco. To reach the mines, they went up the Sacramento river, by boat, to Sutter's Fort, or the little village of Sacramento, which soon grew up near it. Sacramento is then at the meeting point of land and water travel in the heart of a great valley—the meeting point of roads from the East, from Oregon, on the north, and from Los Angeles, on the south. At Sacramento, passengers change cars for different places. There, also, loaded cars of fruit are brought from different fruit districts and sent on their way to the East. The railroads which branch from Sacramento to every part of the State find the city a convenient place for repair and construction shops. Since the city is so centrally located, it has been made the State capital, which adds to its business and importance.

**IS THE BUSINESS OF THE GREAT VALLEY WHOLLY CEN-
TERED AT SACRAMENTO OR SHOULD WE LOOK FOR
OTHER CENTERS OF INDUSTRY?**

The physical map will help us to answer this problem. The map shows two great rivers, one flowing through the Sacramento valley and one through the San Joaquin; each receives large tributaries from the Sierra Nevada mountains.

Most of the towns in the Sacramento valley grew up during early mining times, at points on the streams which could be reached by small boats, and from which freight could be taken on wagons or mules to the mines, or at points near important mining districts. Thus Marysville sprang up on the banks of the Yuba river, Red Bluff on the Sacramento river, Redding at the upper end of the valley, and Oroville on the Feather river.

Stockton was the chief city in the lower San Joaquin valley from which the Southern Mines were supplied. The importance of water transportation in the early days when there were few roads is shown by the situation of this city. Stockton Slough is an insignificant branch of the San Joaquin river, but it is navigable to the point where Stockton is situated.

As the farming and fruit industries developed in the lower San Joaquin valley, Stockton became the most convenient shipping point for the bay region and San Francisco. Flour mills and other manufacturing plants sprung up. Located as it is on the borders of the delta region, in the midst of a great area of exceedingly rich country, the city must become of great importance.

As we study the San Joaquin valley with the object of picking out other favorable locations for great cities, we must take into account that most of this enormous valley has a very dry climate. Water for irrigation is of more importance than water for transportation in the growth of centers of trade and industry.

That district which has the largest river and the largest area over which its water can be led in canals, must fill up with a great number of farmers and fruit growers and support the largest city.

The Kings river, and the delta-like area over which its waters spread naturally, fulfils these conditions best. Look at the map carefully, and you will see how, on leaving the Sierras, the Kings river branches as streams do upon their deltas. The soil is rich and it is easy to build irrigation canals.

As a result of this advantage, we find that the city of Fresno has become the real metropolis of the San Joaquin valley.

There are many other rivers entering the San Joaquin valley. Ought there not to be other large cities also? We find Bakersfield, where the Kern river enters the valley. This

city has become more noted because of the nearby oil fields than for its fruits, farm and cattle products.

Modesto, on the Tuolumne river, is the center of a rich district of fruit, melon and alfalfa fields.

The only cities in the valley which are not more or less dependent upon some kind of farming are Taft and Coalinga, which have sprung up in a semi-desert part because of the discovery of petroleum.

HOW IS IT THAT OF THE TWO GREAT DELTAS, ONE IS SO WET THAT ITS FIELDS HAVE TO BE PROTECTED BY DYKES, WHILE THE OTHER IS SO DRY THAT IT WAS UNINHABITABLE BEFORE IRRIGATION WAS INTRODUCED?

The last sinking of the land along the coast of California made San Francisco, San Pablo and Suisun bays by flooding the lower part of the rivers, which here flowed from the Great Valley through the Coast Ranges to the ocean. The salt water reached almost as far as the sites of the present cities of Sacramento and Stockton.

But the San Joaquin and Sacramento rivers at once began to fill the upper end of this bay with the mud and silt which their spring floods brought down each year.

Gradually marsh lands, over which tules grew, took the place of the salt water, until now all that is left of that part of the bay within the Great Valley is the little sheet of water called Suisun bay.

Every spring the tule lands are flooded, and sometimes, even today, after men have thrown up miles of embankments, the Sacramento river breaks through and makes a great lake of the lowlands below the city of Sacramento.

The delta lands were found to be very fertile and various "islands" among the branching channels were surrounded by dikes of earth to keep out the spring floods. The tules were burned off and crops planted. Fruit trees were planted upon the drier of these lands; the others were devoted to potatoes, melons, asparagus, onions, beets, celery, etc. These products are easily shipped by water to San Francisco, where they find a ready market.

Every year more of the marsh land is diked and made useful. When sufficient reservoirs have been built in the mountains to hold back the flood waters, it will be possible to re-

claim the whole delta and make it one of the most important garden spots of California.

The other delta which we wish to learn about is in the far southeastern corner of the State, and was as difficult to cross, because of its desert character, as the delta of the Sacramento-San Joaquin was because of its marshy character.

A few years ago everyone considered the Colorado desert a worthless waste. Its western part, 236 feet below the sea level, held a salt marsh,—the remnant of a lake which once filled it.

Below Fort Yuma, the Colorado river flows through a vast desert plain till it reaches the Gulf of California. Long ago the mouth of this river was near Yuma, the Gulf of California extending at that time about 100 miles farther north than it does now, and ended near the present town of Indio.

The Colorado river brought down each year an enormous amount of fine mud, which is deposited in the quiet waters of the Gulf. Gradually this mud has accumulated until a vast plain of dry land has been built entirely across the Gulf to the mountains on the west.

Over this delta the river flows in different channels at different times—now it is in one channel flowing towards the Gulf, to the southward; now in another channel emptying its



This canal carries water through the desert to irrigate fertile valley lands farther down.

waters into the salt lake, which the delta has cut off from the gulf.

Year after year the delta grew in extent. Its fine black soil became hundreds of feet deep, but only desert bushes could live upon it. Among these are the mesquite, Mexican creosote bush, sagebrush, greasewood, etc. After a long time the salt bed dried up, leaving only a bed of glistening salt.

Finally, in the year 1890, an irrigation canal was built connecting the Colorado river with a part of the desert on the California side of the Mexican boundary. Crops were planted and fruit trees set out. The pioneer settlers were astonished at the result. Now vast fields of alfalfa, herds of dairy cattle, vineyards and cotton fields stretch for many miles through the heart of a desert once the most dreaded of any in the southwestern part of our country.

The early coming of spring in this region favors the growth of vegetables, which can be put on the market before those of any other locality in California. The canteloupe crop has become one of the greatest in the United States and reaches market before the canteloupes in the San Joaquin valley are ripe. The earliest grapes come from the valley and dates are now making the northern part, known as Coschella valley, famous.

The Colorado delta is larger and has a hotter sun than the Sacramento delta. It resembles the rich delta of Egypt, more than that of any other land.

Shortly after irrigation ditches were built, the Colorado river, during a flood period, broke into a canal and poured a mighty flood of water through the heart of the rich valley, and formed a new lake in the sink where lay the salt bed. The salt works were ruined and the railroad was obliged to move its tracks for some miles. Before the region was wholly flooded, the river was turned back, but Salton sea still remains.

CHAPTER 7.

WE HAVE LEARNED HOW ATTRACTIVE CALIFORNIA IS AS A PLACE FOR A HOME, AND OF ITS ADVANTAGES ON ACCOUNT OF A GREAT VARIETY OF INDUSTRIES CARRIED ON HERE. WHAT IS IT THAT ATTRACTS THE THOUSANDS OF VISITORS WHO COME HERE DURING THE SUMMER AS WELL AS THE WINTER?

1. The wonderful scenery brings people to California during the summer. In this State are found two species of the Sequoia: *Sequoia gigantea* and *Sequoia sempervirens*. These trees are found nowhere else in the world, although there is a related species in Japan. The *Sequoia gigantea*, the famous "Big Trees," are found in scattered groves along the slopes of the Sierra Nevada mountains. These trees are the largest in the world and some of them are very old. The name *sempervirens*, applied to the redwood, means *always alive*. This species was so named because the trees are very hard to kill. When a tree is cut down, several sprouts start up from the stump. The redwood is found near the coast, from Monterey north to Oregon.

Some of the finest groves have been given to the State and United States government and are held as public parks. Of these parks, we might mention *Sempervirens*, situated in the Santa Cruz mountains, and Muir Woods, a little north of San Francisco. There are other parks on the Eel river, and near Eureka.

The Yosemite Valley, in the Sierra Nevada mountains, is the most remarkable valley of its kind in the world. Walls of granite rise very steeply, some being almost vertical and nearly a mile in height. Over some of these cliffs tumble mountain streams in beautiful waterfalls.

Glaciers once covered the higher parts of the Sierras and Klamath Mountains, and slowly creeping tons of ice filled the canyons. When the ice melted, the hollows that it left in rocks, filled with water and formed lakes. There are many hundreds of these lakes scattered along the high Sierras. Beautiful lakes, dashing streams, waterfalls, jagged peaks, forests and clear bracing air make summer life in the mountains delightful.

There are thousands of mineral springs,—some hot, some cold—the waters of which are valuable either for bathing or drinking.

Mt. Shasta is a wonderfully attractive extinct volcano. Mt. Lassen, although once thought to be extinct, has recently been in eruption. Near this peak are hot springs, lava flows and fields of volcanic ashes.

The San Gabriel, San Bernardino and San Jacinto mountains are very picturesque and attractive summer recreation grounds. The San Bernardino mountains are interesting because they once held the southernmost glaciers in the United States.

The beaches on the southern coast attract even more summer visitors than the mountains.

2. The mild winter climate draws people to California from those parts of our country where the winters are cold and snowy. The orange groves, with their bright colored fruit, flowers blooming in the open air, and sunny days, make the winter season a delightful time.

The desert valleys offer a great attraction during the cooler months on account of the beauty of the rugged, barren mountains, the clear air and the strange vegetation. The years when spring rains fall in the desert, it becomes a veritable garden of brilliant flowers.

3. The State highways are an attraction for tourists. One can now travel by automobile upon hard surfaced roads over nearly all parts of the State. Two main highways, with many branches, run nearly the length of the State, one through the coast region, the other in the Great Valley. A third highway runs north and south, east of the Sierra Nevada mountains, and connects the Lincoln highway with Los Angeles.

Besides the main highways, there are branches connecting with the county seat of each county. It is planned to build a highway along the coast, the whole length of the State. This route would afford one of the most wonderful rides in the world. Along what part of the coast would road building be especially difficult?

WHY HAVE THE ISLANDS OF CALIFORNIA AS A WHOLE REMAINED SO NEGLECTED?

Santa Catalina is the only island that has as yet become noted as a summer resort. Water is scarce upon most of the

islands and they have been used mainly for pasturing sheep. The islands, except San Clemente, rise from shallow water and were once connected with the mainland. These shallow waters are remarkably fine fishing grounds, for they are the home of a great variety of food fish.



Desert plants are armed against their enemies. Here is a choya cactus, a ball cactus and a Spanish bayonet all with thorns and sharp spikes.

CHAPTER 8.

San Francisco and Los Angeles.

THE REASONS FOR THE SITUATION, GROWTH AND RELATIVE IMPORTANCE OF THE TWO GREAT CITIES OF CALIFORNIA, FROM THE PROBLEM POINT OF VIEW.

PROBLEM: HOW IS IT THAT THE CITY OF LOS ANGELES, THOUGH IT WAS FOUNDED EARLIER THAN SAN FRANCISCO, AND REMAINED A SMALL VILLAGE FOR MANY YEARS AFTER THE LATTER HAD BECOME A GREAT CITY, HAS FINALLY, IN SPITE OF ITS SEEMINGLY LESS FAVORABLE SITUATION, OVERTAKEN AND EXCEEDED SAN FRANCISCO IN SIZE?

WHY DO PEOPLE GATHER IN CITIES?

1. Long ago cities offered better protection than the open country. Most cities had walls around them which, before the invention of great guns, made those within quite safe. In many parts of the world people still live in villages for protection. They go out to work in the fields in the daytime and return to the villages at night. Walls no longer protect cities, and many of those around cities of Europe have been torn down.

2. Wherever many highways meet, there we find the people gather because of the advantages for carrying on business and trade. A bay where ships can lie in safety, especially if it is connected with the interior by water or valleys, is a place where one would look for a city. Where two rivers meet is another good place. At cross roads, where valleys meet, a city is likely to grow. Water power, which makes possible the building of factories, often determines the place of a city. A rich and thickly settled fruit and farming district will contain a city at some convenient point.

3. Cities attract people, because of the advantages and conveniences which they offer. Libraries, art galleries, musicales, and advanced schools of every kind are found in cities. Street cars, gas for heating and cooking, electricity, etc., make city life comfortable.

4. Where many people are gathered, there are opportunities for every kind of business and amusement.

PROBLEM: PART I—TO FIND OUT WHY SAN FRANCISCO BECAME A GREAT CITY IN SO SHORT A TIME.

SITUATION:

San Francisco is situated upon the northern end of a long narrow peninsula, which lies between the ocean and San Francisco bay. Thus the city has water on three sides. The peninsula has such a commanding position that the Spaniards established a Mission and Presidio there. A little town called Yerba Buena grew up on the shores of a cove on the bay side of the peninsula.

WHY WAS IT THAT, FOLLOWING THE DISCOVERY OF GOLD, THE VILLAGE OF YERBA BUENA BECAME THE CITY OF SAN FRANCISCO, ALMOST IN A NIGHT?

Owing to the difficulty of crossing the continent, many gold seekers came by water. San Francisco bay was the leading point nearest the placer mines, and by taking small boats up the Sacramento river, they arrived at their journey's end with very little land travel. The water of the bay is deep enough for ocean boats to go far up the bay and through the Strait of Carquinez, but Yerba Buena cove was the most convenient and safest stopping place, and so river boats were used from that point. The city of San Francisco naturally grew up back of the cove, where the hundreds of sailing boats loaded with gold seekers anchored.

WHY IS IT THAT BOATS OF THE GOLD SEEKERS DID NOT LAND AT ANY OTHER BAYS ALONG THE COAST?

San Diego bay was the first one they came to, and is easy to enter, but as the mines were far to the north, a journey of 500 miles over deserts and mountains would have been necessary before reaching them.

Before San Francisco sprang up, Monterey was the largest town in California. The gold seekers might have landed here, but there still would have been a long land journey ahead of them.

Humboldt bay was then unknown. To journey from this bay to the mines, it would have been necessary to cross a range of mountains so rugged that only recently has a wagon road been built across it.

WHAT ARE THE PARTICULAR ADVANTAGES OF THE SITE OF SAN FRANCISCO AS COMPARED WITH OTHER POSSIBLE SITES FOR A METROPOLIS ON SAN FRANCISCO BAY?

The cove of Yerba Buena offered a safe anchorage with deep water close to the shore. The land rose gently toward low hills, offering a convenient site for a city. At Sausalito, on the north shore of the bay, the water is deep, but the hills rise so steeply from the shore that there is scarcely room for a town—certainly not enough for a large city.

At the head of the southern arm of San Francisco bay, the water is very shallow. Because of this, San Jose, the chief city of the Santa Clara valley, grew up some miles inland.

On the east side of the bay the water is shallow, but as the country lying back of the shore is well suited to settlement, the village of Oakland sprang up there. The waters of an estuary were deepened, railroads came in and now the City of Oakland has become second in size of all the cities on San Francisco bay.

At the foot of the Contra Costa hills, Berkeley sprang up and has now grown to be a city, though having little dependence upon the bay, because the shore is exposed and the water shallow. Berkeley owes its growth and fame chiefly to the fact that it is the seat of the State University, and is a city very prettily situated at the foot of Contra Costa hills, facing the Golden Gate.

With the coming of the Santa Fe Railroad to San Francisco bay, the City of Richmond sprang up. It is chiefly a manufacturing place.

Far up the bay, near the Straits of Carquinez, there are manufacturing plants and warehouses, where products of the Great Valley are transferred to ocean boats. Mare Island is a naval station close to the Strait.

WHY IS IT THAT THE PEOPLE AND INDUSTRIES OF THE SAN FRANCISCO BAY REGION HAVE NOT GATHERED IN ONE LARGE CITY INSTEAD OF BEING DISTRIBUTED IN A NUMBER OF CITIES?

San Francisco can spread in only one direction, since it is surrounded by water on three sides. Thousands who are engaged in business in the city live in Oakland, Alameda, Berkeley, Sausalito and other places. The people use the ferries and

local cars in going back and forth between these cities and San Francisco.

Railroads from the north stop at Sausalito and Tiburon, situated on the north side of the bay; railroads from the east stop at Oakland and Richmond. All these places compete with San Francisco and take away much of the business that would otherwise go there. From these facts, it is easy to understand why many cities, instead of only one, should grow up around the bay. San Francisco, however, has the advantage of foreign trade on account of its deep water and its nearness to the entrance of the bay.

IN WHAT RESPECTS IS THE POSITION OF SAN FRANCISCO SUPERIOR, FOR HOME AND FOREIGN TRADE, TO THAT OF OTHER CITIES UPON THE PACIFIC COAST OF NORTH AMERICA? IN WHAT RESPECT IS ITS POSITION INFERIOR TO THAT OF OTHER CITIES?

1. The home trade of San Francisco must be large because of the extent of the region tributary to it. The map shows us that all that part of the State north of the Tehachapi mountains might be expected to do most of its business with San Francisco, or the cities close to it. The Great Valley alone, when fully settled and cultivated, should support a city of several millions. No other cities on the Pacific Coast have such a great and rich agricultural country behind them as has San Francisco and her sister cities.

Los Angeles lies in a rich valley and if we took into account Imperial valley and southern Arizona, its tributary country, would compare with that of the bay cities. The harbor, however, is largely artificial and does not begin to compare with San Francisco bay.

San Francisco is reached by railroads from the north, east and south, and its front door, on the west, opens to all the world.

Portland, Oregon, lies at the lower end of the rich Willamette valley and has railroad connections from the north, east and south. It is also connected with the farm lands east of the Cascade range by the Columbia river. The disadvantage of Portland is, however, its location, some distance up the Columbia river from the ocean, and the bar at the mouth of the river is at times quite dangerous to cross.

Seattle is situated on Puget Sound, a great land-locked

arm of the ocean. It has the advantage over San Francisco in that it is nearer the eastern shore of Asia than the latter city and also much nearer Alaska. It has had a greater freight trade than San Francisco. Seattle has the disadvantage of having back of it a forested mountain range, the Cascades. The nearest farming and fruit growing district of much extent lies across this range in central and eastern Washington.

Vancouver, in British Columbia, has a good harbor and a railroad connection with the East, but it is a thousand miles across the Rockies to any great farming area.

Prince Rupert lies still farther north in British Columbia, and has a fine bay. Aside from its mining and lumbering interests, the place is largely a port of entry and shipment of goods from Asia, destined for eastern Canada and Europe.

ALTHOUGH THE SAN FRANCISCO BAY REGION HAS NEARLY DOUBLE THE RAINFALL OF LOS ANGELES, YET THE CITIES ON ITS SHORES HAVE HAD DIFFICULTY IN GETTING SUFFICIENT WATER.—HOW CAN WE ACCOUNT FOR THIS?

There are no high mountains or large streams easily accessible for the bay cities. The coast mountains here consist of many ranges, with many little streams flowing into the bay at different points. These answered the purpose as long as the population was small, but when it became certain that there would soon be a million people in the bay region, something had to be done.

San Francisco considered Eel river as a source of supply, but the difficulty of getting the water to the city was great. The rivers of the Sierras was examined, and finally permission was obtained from the Government to use the Tuolumne river as a source. A dam is to be built across the outlet of the Hetch Hetchy Valley and the flood waters of the river collected in a huge reservoir. The Hetch Hetchy Valley resembles the Yosemite, but is not so picturesque. When the dam is completed, San Francisco will be supplied by means of an aqueduct. The city will not only have all the water it needs, but in the descent of the water from a height of over 3,000 feet, an immense amount of electricity will be generated and used for doing all kinds of work.

CHAPTER 9.

PROBLEM: PART II—TO FIND OUT WHY LOS ANGELES HAS BECOME A GREAT CITY.

SITUATION:

Los Angeles was founded upon the Los Angeles river about 15 miles from the ocean, at a point where the river breaks through low mountains and enters upon a broad plain, which extends to the ocean. To the north of the low hills bordering the river rises the rugged San Gabriel range.

IN WHAT RESPECT ARE THE SURROUNDINGS OF LOS ANGELES APPARENTLY LESS FAVORABLE FOR THE GROWTH OF A LARGE CITY THAN ARE THOSE OF SAN FRANCISCO?

San Francisco is situated on the largest and best bay on the coast of California. The people living upon two-thirds of the area of California naturally trade with San Francisco because of the lay of the land.

The San Francisco region receives abundant winter rains, the amount being nearly double that of Los Angeles.

The original settlement of Los Angeles (Presidio) was founded 15 miles from the ocean. While the position of San Francisco was chosen because of its commanding position, the idea determining the position of the settlement of Los Angeles was a permanent water supply and land that could be irrigated. The Los Angeles river is not navigable; it is a small but permanent stream which is fed during the dry season by springs at the lower end of San Fernando valley. The water of the river sinks in its sandy bed before reaching the ocean.

The nearest protected bay is San Pedro. This was small and of little value naturally for shipping. The real port of Los Angeles in early days was San Diego bay.

Los Angeles was not located at San Pedro harbor, because there was no fresh water there for household use or for irrigation. The city was built where it is because the Los Angeles river afforded a good supply of water, as near the coast as it could be had, and nearness to the coast was desir-

able, because it was not so warm as farther inland, and the early settlers felt safer near the coast. The location was desirable also because it was on the main highway to the north (Camino Real), and because to the east, south and west stretched vast areas of fertile land which could be irrigated from the river.

WHY DID LOS ANGELES REMAIN A LITTLE TOWN FOR MANY YEARS AFTER SAN FRANCISCO BECAME A GREAT CITY?

1. San Francisco sprang up suddenly because of the discovery of gold. It was the gateway to the mines for all those who came by water. Even if gold had not been discovered in California, San Francisco would have become a great city, but its growth would have been much slower.

The village of Los Angeles lay far off the main route to the mines. A few emigrants came by way of New Mexico, Arizona and Southern California, but when they had reached Los Angeles they were still 500 miles from the mines and there was the Mohave desert, two ranges of mountains and the long dry San Joaquin valley to cross.

Since Los Angeles was some miles from the ocean, it had little to do with coastal trade. As far as the early growth of the place was concerned, there might as well have been no ocean near by.

The Padres and early settlers introduced citrus fruits from Spain and found that they grew as well as in their home land. But there was no use in growing more than was needed for their own use, since no market was open to them either across the mountains that hemmed in southern California, or over the ocean that washed its shores. It was not until after the coming of the railroads, and the still later invention of the refrigerator cars, that fruit growing became important. There was another reason why the fruit industry grew slowly, and that was that the eastern market was more easily and cheaply reached by fruits sent from Spain and Italy. Oranges, lemons, olives and raisins were shipped to America in large quantities from these countries. Ocean freights were lower than land freights and the people living about the shores of the Mediterranean sea could raise fruits at less cost than could the orchardists of the Los Angeles region. For these reasons, the growth of the citrus fruit industry was slow in southern California.

The advantages of the climate in the region about Los Angeles were not appreciated in the early days; in fact, most people thought the country was a half desert and that not much of it was good for anything but a cattle range. It took the emigrants from the Eastern States a long time to become accustomed to the long, dry and hot summer and to understand and appreciate the advantages of irrigation.



Business center of Los Angeles.

TO SOLVE THE PROBLEM OF WHY LOS ANGELES FINALLY BEGAN TO GROW RAPIDLY IN SPITE OF ITS APPARENTLY UNFAVORABLE POSITION, LET US CONSIDER WHAT THINGS GUIDE A MERCHANT IN SELECTING A PLACE FOR A STORE.

If you were going to start a store in a country village, what sort of a situation would you look for? Would not a store located in a large and easily accessible valley have more trade than one in a small, remote valley? Would not a pleasant and healthful climate influence people in coming to the valley? Finally, would not a store located where several roads met be likely to do a larger business than one where there was only one road?

Keeping these things in mind, let us look at the position of the little village of Los Angeles in regard to the mountains and valleys that surround it. In doing this, we must remember that the lay of the land largely determined the courses of the roads and trails.

The first highway from San Diego to Santa Barbara and San Francisco lay through Los Angeles. It could not, because of the mountains, take any other course.

The road from San Diego to Bakersfield naturally goes by Los Angeles, up the river and across the San Fernando valley.

The overland trail from Yuma led to Los Angeles on its way to San Francisco.

If one were going from any coast point to San Gabriel Mission and thence on east through the Cajon Pass, he would go by or near Los Angeles.

Los Angeles was, then, a crossroads town. Everyone who traveled to or from southern California was likely to go by way of Los Angeles.

WHAT FURTHER CONDITIONS AIDED OR STARTED THE CROSS ROADS TOWN ON ITS WAY TO BECOMING A GREAT CITY?

As the country settled up, railroads were built into southern California, and they met at Los Angeles and made it their terminal for the same reason that roads and trails had met there. Railroads, we must remember, are built where there are goods and produce to be hauled. The routes, however, are determined by the lay of the land. The valleys and the gaps in the mountains guide their courses.

The railroads centering in Los Angeles made it the trade center for a larger and larger region, and so its business grew as its influence spread and the rich valleys around it settled up.

AFTER THE RAILROADS CAME AND THE VILLAGE GREW INTO A CITY, DID THE CLIMATE FAVOR THE COMING OF PEOPLE TO MAKE THEIR HOMES?

We have learned how the climate changes as we go from the coast inland. On the coast the temperature is remarkably uniform throughout the year. There is seldom frost in the winter and but few summer days that are very warm, and at such times the wind is from off the land. Usually the fog does not reach more than three or four miles inland, but at times the whole of Los Angeles-San Bernardino valley is filled with fog to a height of nearly 2000 feet.

Taking these things into consideration, we find that Los Angeles is warmer and less foggy than the immediate coast, but not so warm as San Bernardino, Redlands or Riverside, these cities being three times as far from the ocean as Los Angeles.

Because of its situation, Los Angeles has, then, a climate neither very hot nor very cold. It is healthful, and as the winter rains are light, permits of an outdoor life the whole year. The early settlers of the Los Angeles region did not realize what an attractive climate they had, but with the coming of the railroads, Eastern people who were hunting a pleasant climate in which to spend their winters, discovered southern California and began to come here in ever increasing numbers. It was found that here in southern California we have much the same climate as that which tourists find so pleasant on the shores of the Mediterranean sea. Southern California is not the only place in the United States where people of the northern and eastern states go to spend the winter, for Florida also has a mild, pleasant winter climate; but California has a greater variety of scenery, and in other ways it is more attractive than Florida.

HOW IS IT THAT OTHER CITIES SPRANG UP IN THE LOS ANGELES-SAN BERNARDINO VALLEY JUST AS OTHER CITIES SPRANG UP ABOUT SAN FRANCISCO?

The water supply, areas of fertile soil and climate determined in a great part the situation of cities about Los Angeles. Pasadena, which has an attractive climate and is beautifully

situated on rising ground at the base of the San Gabriel mountain, is far famed as a winter tourist resort.

San Bernardino was founded by Mormon emigrants who settled near the site of the present city, because at that place there were springs and meadows.

Redlands and Riverside owe their situation to the Santa Ana river, the largest stream in southern California. They are surrounded by orange groves and are also noted winter resorts.

Santa Ana and other cities of the Los Angeles plain are in the midst of a broad area of fertile lowlands. These lands yield a great variety of produce, of which oranges and walnuts are most important.

TO WHAT EXTENT ARE THE CITIES OF SAN DIEGO, LONG BEACH, SANTA MONICA, AND SANTA BARBARA TO COMPETE WITH LOS ANGELES?

San Diego has the best natural harbor on the coast of California, next to that of San Francisco, but the growth of the city, like that of Eureka, on the coast of northern California, has been interfered with by a rugged, mountainous country lying behind it. The Incopah mountain range has only recently been conquered by a railroad; for many years



Magnolia Avenue. One of the beautiful drives near Riverside in Southern California.

the only land connection with San Diego was by roads and railroads down the coast from Los Angeles.

San Diego has, perhaps, the most evenly tempered climate in the United States, the ocean fogs being largely cut off by Point Loma, a long neck of land forming the harbor. The region about the city is very dry naturally, but reservoirs in the mountains now supply an abundance of water and the high "Mesa" affords very pleasant and beautiful sites for homes.

Long Beach is the newest city of southern California. It first attracted attention as a popular beach resort; then the making of an artificial harbor and the coming of factories started the place growing rapidly. Last of all, it has become noted through the discovery, at Signal Hill, of one of the greatest oil fields in California.

Santa Monica has the most sightly and picturesque situation of any of the beach cities near Los Angeles. Behind it, on the north, are the Santa Monica mountains. The bay, although open, was for a time the port of Los Angeles, and a long wharf was built there, at which coast steamers stopped.

Santa Barbara is almost as far up the coast from Los Angeles as San Diego is south of it. The harbor at Santa Barbara is but little protected, though somewhat sheltered by the Santa Barbara Islands, which lie some miles off shore. The city is situated near the southern end of a strip of very fertile coastal plain. The location was considered so attractive by the Padres that they built a mission there. It has a mild, pleasant winter climate and is a popular stopping place for tourists. It will not become as important commercially as San Diego. *Why?*

HOW DID LOS ANGELES FINALLY BECOME A SEAPORT, IN SPITE OF THE FACT THAT IT WAS FOUNDED MILES INLAND?

As Los Angeles grew, it began to feel the need of what



Sunken gardens of Exposition Park, Los Angeles.

most large cities possess—that is, an opportunity to receive and ship goods by water. The little harbor of San Pedro had never been of much use, as it was too shallow for any but small coasting vessels—but it had possibilities.

The city annexed the village of San Pedro and a strip of land extending between the two places; then enlarged and deepened the natural harbor. As the harbor was still inadequate, the Government was induced to build a breakwater, behind which the largest boats can anchor in safety. A great amount of freight now goes and comes through San Pedro, and Los Angeles is practically a seaport. The land is so low back of both San Pedro and Venice that for some miles it will be possible to dredge canals and bring the heart of the city into still easier communication with the ocean.

HOW DO THE COMMERCIAL ADVANTAGES OF LOS ANGELES COMPARE WITH THOSE OF SAN FRANCISCO?

1. San Francisco is better situated for foreign commerce.
2. San Francisco has water communication with the interior of the State.



The photo play industry of Hollywood. Taking a moving picture.

3. All overland freight for San Francisco has to cross the high Sierra Nevada mountains.

4. Freight for Los Angeles has to cross fewer rugged mountains and reaches the coast by the lowest pass (San Geronimo).

HOW DO THE MANUFACTURING ADVANTAGES OF LOS ANGELES COMPARE WITH THOSE OF SAN FRANCISCO?

1. Los Angeles has fuel oil at her door.

2. Fuel oil reaches San Francisco through pipe lines and by boat.

3. Los Angeles uses gas piped from the oil field for heating and lighting.

4. San Francisco has the advantage of a greater amount of electric power closer at hand than that of Los Angeles.

5. San Francisco and Los Angeles both have to go a great distance for their water supply.

6. Los Angeles has a more agreeable climate, since it is warmer and has less fog.

HAS THE FACT THAT LOS ANGELES IS A TERMINAL POINT FOR RAILROADS HAD ANYTHING TO DO WITH ITS GROWTH?

1. Persons going to any point in Southern California are given a ticket reading, "by way of Los Angeles", because that is the point for changing cars; this fact naturally directed attention to the city.

2. The fact that all tourists and travelers had to go by way of Los Angeles led to the building of great numbers of hotels and rooming houses and an increase in importance of all kinds of industries.

COMPARISON OF SAN FRANCISCO WITH LOS ANGELES.

We may say that on the whole San Francisco has the better commercial and manufacturing advantages, but that Los Angeles has the more agreeable climate. The latter advantage seems to be greater than the former, since Los Angeles has outstripped the northern city in population.

HOW IS IT THAT PEOPLE HAVE SETTLED SO UNEVENLY OVER CALIFORNIA?

We have learned that people go where there is something to be done and opportunities for making comfortable

homes. The two great centers of business and trade contain a large proportion of the people of California. The valleys immediately about these two cities are thickly settled, because of the profitable markets for every kind of produce.

The well watered valleys, with railroads running through them, are thickly settled, but the remote districts and rough mountains are thinly settled, because the occupations that can be profitably carried on in these places afford work for but few people—stock raising, for example.

The deserts support few people, chiefly because of lack of water, while the very high mountains support no people at all, because of the arctic climate.

PART II.

United States—The Home of the Busiest and Happiest People in the World.

CHAPTER 10.

GENERAL PROBLEM.

To Find Out What There is About the People of the United States, or About the Home in Which They Live, or About Both Together, Which Makes Them the Happiest, Most Advanced and Most Influential People in the World.

WHAT HAS THE STUDY OF CALIFORNIA TAUGHT US TO LOOK FOR FIRST IN ANY COUNTRY WE ARE GOING TO STUDY IN ORDER TO DISCOVER WHY PEOPLE DO ONE THING IN ONE PLACE AND ANOTHER THING IN ANOTHER PLACE; WHY IN ONE REGION THE LAND IS DOTTED WITH COMFORTABLE HOMES, AND IN OTHERS THE PEOPLE ARE POOR AND FAR APART?

1. The surface of the land has a great deal to do with the kind of work men carry on in different places. The sea-coast, the valleys, the hills, the mountains and the plains each has its own occupation, which is more or less different from those of the other regions.

2. Temperature has even more to do with men's work than the surface has. If your father is a farmer or fruit-grower, he will tell you that each kind of plant or tree is accustomed to a certain amount of heat and cold. Orange trees require a hot summer and cannot be grown where it freezes much in winter. Sweet raisins cannot be made where the summers are cool and foggy. Rice can be grown only where there is a long hot summer and plenty of water.

If one wishes to grow palms that will bear sweet dates, he must go where the air is hot and dry and where there is plenty of water for the roots of the trees. To grow the best apples one must go into the mountains where the winters are cold, or he must go to one of the Northern States where a similar climate is found.

3. The amount of rainfall or the water at hand for irrigation determines whether or not the rich soil of the valleys can be cultivated. If there is plenty of water and the climate is not too cold or too hot, it will likely be thickly dotted with the homes of the farmers. If there is little water these valleys will either have no homes in them or people will take their herds and flocks there during a part of the year.

4. The amount of rainfall determines whether or not Nature can clothe the surface with forests. Where there are forests, there will be lumbermen living. If the forests are too far from market, people will leave them alone. If it is very hot and there is a great deal of rain, the forests may become such a jungle that it will be difficult to do anything with them.

5. Though the climate may be suitable, the farmer will not grow wheat if he cannot get it to market. If the forest is inaccessible the lumberman will not go there. Thus we see that whether a place is near or far from market guides people in the location of their homes.

ONE MUST KNOW THE SURFACE AND CLIMATE OF NORTH AMERICA AND THE EAST, OR DIFFICULTY WITH WHICH THE DIFFERENT PARTS CAN BE REACHED IN ORDER TO TELL WHETHER OR NOT THEY ARE INHABITED. CAN ONE OBTAIN THIS KNOWLEDGE BY ANY OTHER MEANS THAN BY TRAVELING OVER THE CONTINENT?

From a study of the manner in which surface and climate affect homes in California, we can learn a great deal about North America. Physical maps will help us a great deal; pictures, together with stories of life and adventure in different parts, will also help.

We have learned from California that the winds and storms usually come from the west, off the Pacific ocean, and that when the winds blow from the land that they are dry. In the winter these land winds are cold, because they blow off the cold interior. In summer the land winds are hot, because

the interior over which they pass is hot. The ocean winds are always cool, because the ocean is always cool.

The mountain ranges (Coast range and Sierra Nevada range) lie across the path of the ocean winds. They take from the winds their coolness, their fog, their clouds and their rain. On the eastern side of the mountains it is hot in summer and there is little rain, while in winter it becomes colder than near the coast.

California also teaches us that the highlands, such as mountains and plateaus, are much colder than lowlands; that the mountains receive much more rain or snow than the lowlands, and that plateaus, plains or valleys, cut off from the ocean by mountains, or surrounded by mountains, have a dry climate. Let us think of these things now with a physical map of North America before us. To help us gain a knowledge of the climate of North America, we must also compare the latitude of various parts of California, remembering that distance from the ocean winds and height make the climate of a place sometimes quite different from what we would think from its latitude that it ought to be.

SINCE SURFACE AND CLIMATE AND EASE WITH WHICH DIFFERENT PARTS CAN BE REACHED, DETERMINE WHERE MEN SETTLE AND WHAT THEY DO IN NORTH AMERICA, LET US FIND OUT SOMETHING ABOUT THESE THINGS.

The map shows us that a great highland extends north and south across the western half of North America. California lies in about the middle of the western slope of this highland. Great as our State is, it occupies only a small part of this highland.

Along the Atlantic coast there is another highland—not so extensive or so high. There is no break in the western highland, the whole length of the continent, but the Eastern or Appalachian highland is broken in two places.

Between these two highlands is a great lowland extending from the Arctic ocean and Hudson Bay on the north to the Gulf of Mexico on the south. Because of the many rivers of this lowland, it appears to be easy to go by boat from the heart of the continent to the ocean, in three different directions. If we were in northern Minnesota, we could launch a canoe upon a stream which would finally take us to Hudson Bay. We could start upon the headwaters of the Mississippi

and reach the Gulf of Mexico, or upon a stream which would take us to Lake Superior, and down through the Great Lakes and St. Lawrence river to the Gulf of St. Lawrence and the Atlantic. Westward we could not go by water because of the lofty crest of the Rocky Mountains.

One would judge from the map that the eastern half of the continent ought to be the most thickly settled, and that the western highland should contain the fewest people. Judging from the surface the region around Hudson Bay ought to be thickly settled, because it is a lowland and cut by many rivers and lakes. Perhaps, though, the climate will tell us a different story and cause us to change our minds.

Can we form any conclusions about the climate of North America from what we have learned of the climate of California? The land lying to the north of California must have longer and colder winters, with more snow and ice. The lands south of California must have long summers. High mountains



Canoes are almost the only means of travel through the vast forest region lying north and northwest of the Great Lakes. "Shooting a rapids" is an exciting and dangerous undertaking.

must have a cool climate and snow on their summits, even though they are situated in the hot belt. Plateaus must be dry if there are mountains between them and the ocean, and be cold in winter and hot in summer. Valleys with no mountains to cut off the ocean winds must have an abundant rainfall, but if mountains do cut them off from the ocean, they must be dry and cold in winter and hot in summer. Call to mind examples of these things in California and then tell us what ought to be the climate of the plateau of Mexico, of the lower Mississippi valley, of the upper Mississippi valley, of Nevada and of the Rocky mountains.

The California winds and storms usually come off the ocean. If we should travel southeast from California along the coast of Mexico, we would find the winds becoming changeable, and when we reached Central America we would find them blowing steadily from the northeast.

If we should take a steamer for Alaska, we would meet westerly or northwesterly winds all the way. The skies would become so cloudy and the rain so frequent that even in summer we would find but few days when we could see the wonderful snowy mountains, the highest in North America.

Now what happens when the sea winds and the storms they bring cross the mountains and go on their way eastward across the heart of the continent? From what we know of California, would you say that between the Sierra and Cascade ranges, and the Rockies, it must be very dry, and that east of the Rockies it must be still drier.

But how can it be that the Ohio and Mississippi valleys are so rich and fertile if the winds that reach them from the Pacific are dry? To understand this, we should know that the winds that bring rain do not blow in straight lines, but revolve, as does the air, in a dust whirl. Where the whirling air comes off the ocean, it is moist and drops rain. By the time the whirl has gone east far enough, so that no part of the air comes off the ocean, there is little rain except upon the high, cold mountains. We are right in thinking that the great plains that lie east of the Rocky mountains ought to be dry.

But as the whirl goes on east, you will see, if you draw an imaginary one on the map, that it will by and by reach the Gulf of Mexico and then the Atlantic ocean. As the whirl is turning in a direction opposite to that of the hands of a clock, it will pick up moisture from the water and carry it far inland

so as to bring rains and make productive the whole of the eastern part of the continent. The Appalachian mountains are not high enough to cut off much of this moisture, and so an abundance reaches the Ohio and Mississippi valleys. Before the winds reach as far west as the Great Plains, they become dry, because they have lost their moisture.

These are the reasons why the Atlantic and Gulf coasts and Appalachian mountains receive such heavy rains that the whole region is covered with forests. The Ohio river receives a little less rain so that open, grassy prairies begin to take the place of the forests as we go westward. The Mississippi valley, still farther west, was wholly a prairie, with trees only along the streams, when people first went there. Beyond the prairies, in the direction of the Rocky mountains, the great plains become almost a desert.

It is only the storm winds that whirl; the ordinary winds



A forest of hardwood trees in the southern Appalachian Mountains. Note the clearing in the foreground with its rail fence.

blow from a westerly direction, just as they do in California. This will help us to understand why it is so much colder in winter in the interior of the continent than it is in California. It will also help us to understand that if we went due east from Southern California to the Atlantic coast, we would find ourselves far north of the orange district of Florida. In northern Florida the winters are usually mild enough for growing oranges, although cold storms from the interior sometimes freeze them. It is not until we reach southern Florida that we get outside the frost belt and find bananas and pineapples growing.

Since North America is 3000 miles across, from west to east, we must expect that in the heart of the continent the winters would be very cold and the summers very hot. Any land situated as California is, with sea winds blowing over it, has a mild, even climate. The farther we go from the ocean, as we have seen in California, the greater the difference between winter and summer becomes.

What does the map tell us as to the ease or difficulty of travel over North America? The broken coast line of the greater part makes it very easy to land on its shores. California has fewer good harbors than any other part of the coast.

The many great rivers flowing across lowlands, and the many lakes, both large and small, of the eastern half of the continent, must have made traveling quite easy even before there were good roads and railroads. If the Mississippi river flowed through a mountainous country, as do the Colorado and Columbia rivers, we could be very certain that it would not be of much value for navigation.

With the exception of the lower Sacramento and portions of the Columbia river, the Pacific coast rivers flow entirely through mountains and cannot be navigable. The streams flowing from the Appalachian highlands ought also to be swift.

The map shows that the high plateaus between the Rocky mountains and the Sierra Nevada mountains contain few rivers, and there appear to be several lakes without outlets. This bears out what we have already learned, that plateaus are dry and are likely to be thinly inhabited.

CHAPTER 11.

HOW IS IT THAT OF ALL THE DIFFERENT PEOPLES WHO HAVE MADE THEIR HOMES IN NORTH AMERICA, THE ENGLISH SPEAKING PEOPLE HAVE TAKEN THE LEAD AND HAVE DONE THE MOST TO MAKE NORTH AMERICA THE MOST IMPORTANT OF ALL THE CONTINENTS?

The English came to North America to stay, to make their homes and to found a freer and better country than any in Europe. They were not looking for wealth from trading with the Indians, nor for mines of gold or precious stones. They wanted to establish comfortable homes in a free land and make their living by cultivating the soil.

They landed upon the eastern coast, because that was the first land they reached. It was covered with forests and the soil was rocky, but the climate was much like that of their old home in England. They did not know of the rich prairies in the interior, or that from their landing places it would be difficult to reach the interior, because of mountains.

The Spanish explorers went farther south, following Columbus, and took possession of lands having a warm climate like that of their home country. These lands included the West Indies and those bordering on the Caribbean sea and Gulf of Mexico. Their first thoughts were not of making new homes, but of finding gold, silver and precious stones and of acquiring new lands for the glory of Spain.

The Spaniards did not like to work, and so enslaved the Indians, and when there were not enough Indians they brought negro slaves from Africa.

The French took possession first of the St. Lawrence river valley. This region was forested and colder than that where the English settled, but it had a great advantage in that the river was an open highway into the very heart of the great continent. They did not have to climb any trackless mountains or cut through the forests.

The French were not interested so much in farming and making homes as they were in exploring and establishing posts

for trading with the Indians. These explorers, with their canoes, went up the St. Lawrence to the Great Lakes and did not stop until they had reached the upper end of Lake Superior; then turning back to Lake Michigan, they crossed the lowlands between Lake Michigan and the Mississippi. From Lake Erie they crossed to the Ohio river. They went up the Mississippi to where the Falls of St. Anthony blocked their way; then they followed the river down to its mouth, below New Orleans. Trading posts were established at different points on these great waterways.

The French colonists were very much more fortunate than the English in possessing an easy route from the Atlantic into the heart of the continent and it looked as though the latter would be kept from crossing the Allegheny highlands. It seemed as though the French were going to hold all the interior and northern parts of the continent, while the Spanish claimed all the southern and western parts, nearly as far north as the southern end of Alaska.

We have to thank our hardworking and energetic grandfathers that ours is today chiefly an English-speaking continent and that the United States is the leading country in it.

The Indians had lived in North America for a long time before white people came, but they did not know how to make use of its wonderful riches. Their dwellings were but rude shelters and they lived by hunting, fishing and gathering wild nuts and berries, although some tribes raised a few vegetables.

The Aztecs, of Mexico, had made more progress, for they built stone buildings and had discovered how to use gold and silver, and lived largely by agriculture.

The Spaniards have held the rich lands about the Gulf of Mexico for 400 years, but most of the people of these lands are still poor and backward.

The French settlements remained confined chiefly to the St. Lawrence river valley, for the English finally crossed the Appalachians and drove them from the great interior lowland.

None others of the settlers of North America had the energy and ambition to spread over the continent and develop its wonderful riches as the English have done.

WHAT ARE THE OCCUPATIONS WHICH PEOPLE USUALLY ENGAGE IN FIRST WHEN THEY GO INTO A NEW COUNTRY TO MAKE THEIR HOMES?



Each man split his own lumber for his home in the early days before there were any sawmills.

A long time ago all the people on the earth lived by hunting and fishing and ate only such nuts, fruits and vegetables as grew wild. Later they learned how to cultivate the soil, domesticate the wild animals and improve the wild fruit.

When civilized people first explored and settled North America, they had to depend chiefly for their food upon hunting and fishing, as their own ancestors once did, and as they found the Indians doing. The business of getting something to eat was the most important.

In the matter of hunting, the first settlers had the advantage of the Indians, because they brought guns with them, whereas the Indians had only bows and arrows. They had to build houses for themselves and before long it was necessary for them to make their own clothes.

One business engaged in by our forefathers was trading with the Indians. This business soon grew to great importance, as we shall see a little later. The Indians sometimes brought food, such as corn, nuts or maple sugar, to exchange for beads and other trinkets. The trade in furs was a source of great profit, first to the French and later to the English.



Our grandmothers made their own soap. They used lye made from wood ashes and the fat from their meat. These substances they cooked together in a huge kettle out-of-doors.

CHAPTER 12.

WHAT HAVE WE ALREADY LEARNED ABOUT NORTH AMERICA THAT WOULD LEAD US TO BELIEVE THAT IT WAS ONCE A HUNTERS' PARADISE?

North America has a great variety of climates, varying from the very hot and wet coast lowlands in the south, to the hot and dry deserts in the southwest, and the cold, snowy northlands.

North America has all sorts of slopes, varying from the great valleys and plains in the interior, to lofty plateaus, mountains and canyons. Therefore, we would expect to find a great variety of food plants growing in these different climates. Where there is an abundance of food plants, we always find a great number and variety of wild herbivorous or grass-eating animals. Herbivorous animals are the food of flesh eating or carnivorous animals, and so the latter animals are abundant where plenty of herbivorous ones are found.

Elk, deer and antelope lived in the open, or partly open grass lands, such as the prairies of the Mississippi valley and the Great Plains. The buffalo, in immense numbers, fed upon



General view of Huntingdon, Pa., and Juniata Valley.

the plains. In the hills and mountains, where the surface was partly grassy and partly forested, other grass eating animals lived. In company with them were the bear, panther, coyote, wolf, lynx, etc.

The marshes, lakes and rivers were the homes of incredible numbers of ducks, geese and other fowl. Many smaller game animals and birds abounded everywhere. Towards the north the moose and caribou were found, and in the southern part lived the puma, jaguer, sloth and peccary.

The skins of most of these animals were used by the Indians and pioneers for various purposes, especially for clothing. Many other smaller animals were captured chiefly for their fur. The farther north the furs were gotten the more valuable they were, because the colder the weather the finer and thicker grows the fur.

Among these smaller animals were the beaver, mink, otter, muskrat, and others. These were trapped and bartered for their fur, and getting them out of the wilderness of the interior formed the basis of the first great industry in North America.



The trapper builds the rudest sort of cabin. It is just large enough to offer protection from the storm.

Most of the pioneer farmers hunted and trapped on their own account during the winter, when they could do no farm work. Many men made a business of yearly trips up the Missouri river to the Rocky mountains for the purpose of hunting furs and trading with the Indians.

The early French fur trade was a very important one, since they could go with their canoes from the Atlantic to the head of Lake Superior. They had many posts along the lakes.

When the English took possession of the northern part of the continent, the Hudson Bay Fur Company spread its posts all over the northwest to Oregon, to Hudson bay, and almost to Alaska. This company grew wealthy in the fur trade and exercised a great influence upon the Indians.

Almost all of the fur bearing animals have now disappeared from the thickly settled parts of the continent. People hunt animals now more for sport than because they have need of their flesh as food. It is only in the northwest that hunting and trapping is still an important industry.

So much hunting has been done that there is danger of all the wild animals being killed. Therefore strict laws have been passed to preserve what are left. Only for a part of each year is one allowed to hunt some species; this time is called the open hunting season. Bird sanctuaries have been established, where many birds nest, as in the marshes, about lakes, and along the coasts. The great game animals, such as the buffalo and elk, were almost all killed off, but now these, together with many species of bear, deer and antelope, are cared for in the National parks.

WHAT NATURAL FEATURES OF NORTH AMERICA HAVE MADE FISHING AN IMPORTANT INDUSTRY FROM THE EARLIEST DAYS DOWN TO THE PRESENT?

The best fishing grounds along our California coast are located where shallow waters extend far out from the shore and about the rocky islands and submerged reefs or "banks". In such places there is the most food and best spawning grounds.

The Atlantic coast is bordered by shallow water. There are many deep bays, while far out, especially in the vicinity of the Island of New Foundland, there are vast shoals or banks where innumerable food fish make their home.

The settlers along the Atlantic coast early turned to fish-

ing to help out their food supplies. Later, when they had discovered the "banks" they began to catch fish to sell. These were salted down and shipped to Europe, where there was a good market.

Fishing became the chief industry of the men of many of the towns scattered along the New England coast. As the New England "Banks", where they went for cod, and also the New England coast, were often very stormy, the fishermen became expert sailors.

These fishermen often became sailors upon deep sea ships that sailed to the West Indies for molasses and sugar, to Europe with the products of the colonies, or to the Arctic regions in search of whales. For many years the whaling industry made New England noted. Its ships sailed all over the world. To the fishing industry we can trace the success of the American seamen in the war of the Revolution.

But cod and halibut, smelt and mackerel fishing is not all of the industry connected with the life of the ocean. Lob-



The interior of a herring packing plant. The fish are being prepared for market.

ster fishing employs a great many men. The raising of oysters in the shallow, sandy or muddy bays south of New York supplies this valuable food to people all over the continent.

The broken coast line and the many islands of the north Pacific coast afford a favorable home for fish of many kinds, of which salmon and halibut are the most valuable. So thoroughly have the salmon traps caught these fish as they leave the ocean for the mountain streams to spawn that this species will become extinct if protection is not offered them. Many of the fish upon the Atlantic coast and in the Great Lakes are also in danger of being entirely destroyed.

The trout in the smaller streams of the country would be entirely killed off if it were not for Government hatcheries, where spawn is taken and from which young fish are distributed.



Before the invention of the seed drill the farmers sowed their grain by hand.

CHAPTER 13.

AS NORTH AMERICA SETTLED UP, PEOPLE BEGAN TO DEPEND LESS UPON HUNTING AND FISHING FOR A LIVING. GAME GREW SCARCE AND THE GETTING OF IT WAS VERY UNCERTAIN. WHAT WAS THE ONLY OTHER OCCUPATION THEY COULD TAKE UP THAT COULD BE DEPENDDED UPON TO SUPPLY THEM WITH FOOD ALL THE TIME?

Cultivating the soil, raising crops and storing what is not needed at once, makes one certain of food the whole year. How often do fishermen go with little to eat when it is stormy so that they can not go out on the water, or the fish fail to come to their usual feeding grounds? How often do those who depend upon hunting fail of finding game?

To be sure, we often read of famines among farmers in other parts of the world. This sometimes is the result of their not knowing how to irrigate their crops. It is partly due to their eating up each year's crop and not saving anything ahead for a dry year.

The farmers of North America have, however, always had enough to eat, because rains never completely fail. If they are short in one place, food is sent to that place from another where the crops have been good. In a good farming region, people always have something ahead, and they never have to go hungry.

WAS IT NOT A FORTUNATE THING THAT THE ENGLISH, WHO WERE TO BECOME THE FUTURE FARMERS OF NORTH AMERICA, SETTLED IN THAT PART OF THE CONTINENT WHERE THE CLIMATE AND METHODS OF FARMING WERE SIMILAR TO THOSE OF THEIR OLD HOME IN EUROPE?

The English were accustomed to a temperate climate and summer rains. What do you suppose would have happened if the Atlantic coast had had the climate of California? Coming from England, where it rains almost every week in the year, the first settlers would have starved to death in a climate like that of California, where the rich valleys are sometimes six months without rain. If the eastern coast had had our climate, it is possible that there would have been no United States.

We, here in California, believe that farming by irrigation is the best and surest way; but we must not forget that it takes years to learn the best methods of watering the land so as to grow crops.

The Spaniards succeeded in carrying on farming upon the dry plateau of Mexico and in California, because they were used to a similar climate and understood irrigation. They shunned the hot, wet and sickly coast lowlands about the Gulf of Mexico, for they were no more used to such conditions than the English were. The West India Islands, though they had a hot climate, were healthful because of the nearness of the ocean and the sea breezes. The Spanish cleared the jungles and became successful growers of sugar cane, through the work of their slaves.

WHY DID THE ENGLISH FARMERS UPON THE EASTERN COAST, WHEN THEY NEEDED MORE ROOM, GO WEST INSTEAD OF NORTH OR SOUTH?

North of Lake Superior and the St. Lawrence river the conditions are unfavorable to farming. The great cold of the long winters, the dense forests, the rocky surface, turned away the farmers who were looking for a better land than that along the Atlantic coast.

South of the Chesapeake bay the settlement of the coast lowlands was slow; there were fewer good harbors and the immediate coast was sandy and marshy.

The Appalachian mountains grow higher and more rugged toward their southern end and completely shut away the interior for hundreds of miles. To go around to the end of these mountains would have required a journey from Philadelphia or Baltimore so far toward the southwest as to have brought the pioneers almost to the Gulf of Mexico. The Gulf lowlands, with their swamps and jungles, the summer heat, and malaria, were dreaded as much as the northern cold, and so for many long years, very few settlers went into the Gulf or lower Mississippi valley region.

To the westward, then, lay the only opening for those who were in search of more and better farm lands. The vast and mysterious interior beyond the mountains awakened their curiosity, but they were long held back, not only by the mountains but by the savage Indians. But westward our pioneer forefathers finally went in spite of all obstacles.

HOW DID THE PIONEER FARMERS FINALLY GET ACROSS THE MOUNTAINS, AND DID THEY FIND ANYTHING BEYOND TO REPAY THEM FOR THEIR EFFORTS?

The Appalachian highlands seem low when compared with our California mountains, for the highest peaks rise to only a little over 6,000 feet. But nevertheless you would think it a very hard matter if you had to cross them with all your household goods, and with no roads. The slopes were steep and rocky and everywhere covered with forests.

The gap in the highlands known as Mohawk valley, and through which the Erie canal was finally built, was held for many years by the Iroquois or Five Nations (tribes of Indians) so pioneers could not make use of it.

Roads were finally built across the mountains from Philadelphia and from Baltimore to the Ohio river, the woods became less dense and open grassy lands began to appear, and still farther, these were replaced by larger areas of grassy lands, which were called prairies. There the farmer emigrants stopped. This was the promised land. They did not have to cut down and burn the trees before they could put in crops. They found land ready for the plow. There were no rocks and the soil was rich and deep. There was plenty of water and wood was to be had in abundance along the streams.

This rich and productive land was found to extend over the Ohio and all the middle portion of the Mississippi valley. Toward the lower Mississippi valley, however, forests again replaced the prairies. Towards the north, the venturesome ones came to forests and lakes, but toward the west and northwest the prairies seemed to be endless.



Harvesting wheat upon the prairies.

Beyond the Missouri the land was found less productive, because of a smaller amount of rain, and this, together with danger from the Indians, stopped for some time the westward march of the farmers.



In this fertile prairie region of the Ohio Valley our forefathers cut their hay by hand.

WHY SHOULD WE EXPECT THE PRAIRIE REGION TO BE FILLED WITH A DENSE FARMING POPULATION?

The prairie region lies between the hot Gulf lowlands and the cold rocky northland. It is midway between the desert-like plains at the base of the Rocky mountains and the forested Appalachian highlands. The soil is fertile and the climate is healthful, although as we should judge from its position in the heart of the continent, the changes between winter and summer are great. No land could be better situated as regards ease of travel and shipment of products. There are navigable rivers and lakes, while the surface is so even that it is easy to build canals and railroads.

WHY WERE THE WESTERN HIGHLANDS FOR A LONG TIME SO LITTLE THOUGHT OF AS A FARMING REGION?

The map shows us in the first place that it is largely a land of mountains and high plateaus. Farmers do not love



This is one of the beautiful valleys of New Hampshire much resorted to in summer by city people. The peak is part of the White Mountains.

mountains, and we cannot blame them. The Appalachian mountains are even now thinly peopled by farmers, although these mountains are neither so rough nor so far away from



A glimpse of Broadway, New York. The section shown here is a part of the financial district.

the markets as those of the west. The valleys among them are well watered; the plateaus and valleys from which the western mountains rise are dry and desert-like.

We have already learned why there is so little rainfall except upon the mountains. The Eastern farmers skipped most of the mountain region and went on to the Pacific Coast. In western Oregon and Washington they could grow crops without irrigation, but in California they did not prosper until they had learned the use of irrigation.

NOW FARMERS SEND MOST OF THEIR PRODUCT TO MARKET BY TRAIN AND TRUCK. HOW DID THEY MANAGE WHEN THERE WERE NO RAILROADS AND BUT FEW WAGON ROADS?

The pioneer farmers did not pay much attention to markets, for they had all they could do to supply themselves. Each farmer raised a little of many things, because that was the only way to get what he wanted.

The New England farmer usually went to market on horseback, until wagons and roads came. Most of the streams were too swift for boating.

The Southern farmers lived mostly in the Piedmont region. By this is meant the rolling foothills of the Appalachian mountains that lie back of the Coastal Plain. Their tobacco and cotton they shipped by boat down the sluggish streams. These streams were navigable up to the border of the hill-land.

The dweller along the Ohio river sometimes built rafts and sent what he had to trade down the river to New Orleans, but this market was small, because few ships then visited this remote place. The return home was difficult, being made partly or wholly overland.

The French settlements along the Mississippi river and shores of the Great Lakes had only furs to send away. These went by canoe through Lakes Michigan and Huron, and from there, to save the long portage around Niagara Falls, they crossed to the Ottawa river and then down that to the St. Lawrence and Quebec.

THE FARMERS OF THE OHIO AND MISSISSIPPI VALLEYS WERE NOT FAR FROM NAVIGABLE RIVERS AND LAKES, BUT DID NOT USE THEM TO ANY GREAT EXTENT. WHAT WAS THE REASON FOR THIS?

In order to answer this question, we shall have to learn what the farmers had to sell and in what direction their market lay. They found the prairie well suited to wheat, because the soil was rich and there was plenty of rain. They found the climate suited to corn, for the summer season was long and the days hot. It was not long before they had these and other products to spare. Most of the people of the continent lived near the Atlantic coast, from New England southward. It was difficult to raise wheat and corn in fields of large size in the forests and among the rocks of New England, and so the wheat and corn of the Ohio and Mississippi valleys were in demand. But how were the products of this region to be gotten to New England?

The Ohio and Mississippi rivers and their tributaries did not flow in the right direction. If the farmers put their grain on flat boats and floated it down to New Orleans, they would then be farther from markets than when they started. The journey was a long and dangerous one. At New Orleans the grain would have to be transferred to ocean boats, of which few were to be had. The map shows a very low water parting between the Mississippi valley and streams which flow into Hudson bay; in fact, if we went to the very head of the Mississippi river in a canoe, we would have to carry it only a mile in order to launch it upon a stream headed toward Hudson bay. We have, however, already discovered that it would have been then and is even now impossible to use this route from the heart of the continent to the Atlantic ocean.

There remains but one natural waterway, that by the way of the Great Lakes and the St. Lawrence river. Why did not the farmers make use of the route of the French fur traders?

In the first place the route lay much of the way through Canada, which was British territory. In the second place, until a canal was built around Niagara Falls, grain could not profitably be sent down the St. Lawrence river. In the third place, when produce had reached the Gulf of St. Lawrence, it was still a long distance from the New England market. In the fourth place, the Gulf lay far to the north, where long winters interfered with navigation.

THE FARMERS DID GET THEIR PRODUCE TO THE ATLANTIC COAST IN SPITE OF THESE DIFFICULTIES. HOW WAS IT DONE?

The map will help us to answer this question. There are valleys between the Ohio river and Lake Erie where the land is but little higher than the lake, so that if the lake were to rise a little, the water would run over the rim of land and down to the Ohio. Through two of these low places, canals were dug so that loaded boats could reach Lake Erie. Between the lower end of the Lake and the Hudson river there lies a low gap in the Appalachians, of which we have already spoken. This is called the Mohawk valley. The people of the City and State of New York wanted the trade of the western farmers, and so they went to work and built a canal through the Mohawk valley. After this was done (and it took a number of years) the produce of the Ohio and Mississippi valleys could go all the way to New York City by water.

So anxious was Philadelphia to get the western trade that a canal was dug almost all the way to the Ohio river. The steepness and height of the Allegheny mountains finally made them give up and most of the canal is now abandoned.

WHY IS IT THAT NOW MORE CORN THAN WHEAT IS GROWN IN THE MISSISSIPPI VALLEY, THOUGH THE AMOUNT OF CORN THAT PEOPLE EAT IS MUCH LESS THAN THAT OF WHEAT?

The central part of the valley has been found wonderfully well suited to the growing of corn, and more is raised



Now the farmer uses a tractor instead of horses to haul in his hay.

there than in all the rest of the world. The soil is rich, the rainfall is abundant, while the long hot summer favors the growth and ripening of corn. For many years farmers have carefully selected their seed corn, so that the corn now raised is very much superior to that first obtained from the Indians.

How do the farmers dispose of this corn if they do not want to eat it all? They do not sell much of it to the hungry people of Europe, for the most of those people will not eat it because they do not know what it is and have never seen it growing. We buy some of this corn here in California for ourselves and our chickens, though we might, if we would, raise all we need.

If we should take a trip through the corn belt we would soon discover what becomes of the surplus corn. Almost every farmer has a few pigs and corn is the cheapest and best food for fattening them. If we were studying hogs, we would find that there are more hogs in the corn belt than in all the rest of North America.

In the early days of the Mississippi valley, there was far more wheat than corn grown, because of the good market for wheat. Since hogs bring a good price and the market for them is near by, and corn produces more than wheat to the acre, people in the central portion of the valley have turned more to corn and hog raising.

We must not, however, think that wheat growing has declined in the Mississippi valley and adjacent regions. Wheat will grow farther north than corn, and where the season is shorter. Wheat will also grow well with less rainfall. Thus it is that we find most of the wheat now grown to the west of the corn-belt, in the direction of the Rocky mountains, and also northwestward in Canada, where the vast prairies have rain enough and a season long enough for wheat, rye and oats, but not long enough for corn.

Wheat is not generally fed to animals except chickens, but it is one of the chief foods of the people of North America and Europe, and other lands where white people have gone and made homes.

California raises some wheat in the more moist parts of the Great Valley. The farmers have been careless and have not fertilized the soil sufficiently, so the yield is less per acre than it used to be. Washington and Oregon have great wheat

fields and we buy some from there. We also get some wheat from Dakota, because Dakota wheat is especially good.

WHY IS IT THAT ALTHOUGH THE SOUTHERN STATES ARE ESPECIALLY WELL SUITED TO CORN AND THE NEGROES ARE VERY FOND OF IT, THAT THIS REGION IS MORE NOTED FOR OTHER PRODUCTS?

People raise not only those things that thrive in their home climate but also those things for which there is the best market. Corn grows all through the South. It is an important article of food for people, and many hogs are also fed on it, but not as many as in the central Mississippi valley. The South is farther from market and it costs more to ship the hogs.

Long ago it was discovered that cotton thrives in a belt running from Carolina south and west around the Gulf of Mexico. Cotton is not as particular about where it grows as are some other plants. It is easily taken care of, and although picking it requires a great deal of work, it almost always brings a good price. This shows us that each section of the continent grows certain things better than it does others.



Mississippi River steamers loading cotton at Memphis.

Farmers are happy when they find out the most profitable crop for their home region.

The cotton belt is 1,000 miles long, making the greatest cotton field in the world. The farms in the corn belt are not large, as corn requires careful cultivation. The farms in the wheat belt are usually large because the vast, almost level prairies are easily cultivated and wheat requires little care after plowing and planting.

In the early days of cotton growing, the land was owned in large tracts and called plantations, and the work was mostly done by negro slaves. Now most of the plantations have been cut up into small tracts, more like Northern farms, where the negroes either work for themselves or hire out.

SINCE THE COASTAL BELT OF THE SOUTH ATLANTIC AND GULF STATES IS LOW, WET AND HOT, CAN WE NOT THINK OF SOME OTHER FOOD PLANTS THAT OUGHT TO THRIVE THERE?

If you will look at the map you will discover that only the extreme southern end of the continent is far enough south to ever have the sun directly overhead. But the lands all about the Gulf of Mexico have a mild climate and some plants thrive there that are more often found in tropical lands. Can we think of any tropical food plants that grow and mature in one summer?

Pineapples and banana plants live from year to year, but will not stand frost. Banana plants are grown for decoration about the Southern California homes, but, if you will notice, they do not bear fruit and are often frozen down to the main stem.

Pineapples and bananas, of course, grow in abundance in Southern Mexico and Central America, but the only place in the United States that they thrive is on the extreme southern end of the Florida peninsula. This is the only place in the United States where there is no frost.

Oranges and similar fruits are grown in large quantities in Central Florida, but sometimes the cold "northers" sweep far south and injure the crop and trees.

We come now to sugar cane and rice, two food plants that are grown almost everywhere in the tropics or hot belt around the world. They require long hot summers and plenty of water and rich soil. To them it does not matter if it does

freeze in the winter, for the seed is sown in the spring and they are harvested before the frost comes in the fall.

Then ought not the low wet coast lands, with a long season and hot climate, be just the place for rice? The fields can be easily flooded because of the abundance of water. Before it was discovered that rice thrives in California, we used to get Carolina, Georgia or Texas rice in our stores, as well as that from the sub-tropical lands across the Pacific.

We have all heard of New Orleans molasses. Does this mean the molasses from foreign lands is brought to New Orleans, or does it mean that in the vicinity of that city there are fields of sugar cane?

New Orleans is situated on the delta of the Mississippi river. The vast rich stretch of low and marshy land along the lower Mississippi river has been built up by mud brought down by the river, just as the Colorado river has built the vast rich delta of Imperial Valley. The abundant rains, the rich soil and long hot summers of the Mississippi delta have made this the chief center of sugar cane upon the mainland of North America. The Island of Cuba of course produces more cane sugar because it is almost wholly given over to this industry.

CORN FORMS ONE OF THE CHIEF FOODS OF THE MEXICANS, WHOSE HOME IS FAR TO THE SOUTH OF US, WHERE WE USUALLY THINK OF THE PEOPLE AS LIVING UPON COCONUTS, BANANAS AND OTHER TROPICAL FRUITS. HOW CAN WE EXPLAIN THIS STRANGE FACT?

We have heard of Mexican "tortillas," a thin cake of crushed or ground corn, which Mexicans like so much. We have all eaten the delicious tamales, with their highly seasoned chicken and corn meal wrapped in corn husks. How does it happen that corn, a native of the United States, where the climate is temperate, thrives so well in the tropics?

To answer this question, we will have to find out something about the surface of Mexico. We have already learned in the study of California that climate depends partly upon height above the sea. We have learned that the productions change as we climb the Sierra Nevada mountains. The physical map shows us that the greater part of Mexico is a high plateau and that the lowland is confined to a narrow strip along the coast.

Landing on the coast of the Gulf of Mexico, opposite Mexico city, we find ourselves, just as we would expect, in a dense tropical jungle, where it is very hot and there is a great deal of rain. Where the land has been cleared there are groves of bananas or fields of sugar cane. As we go inland, we begin to climb and soon find ourselves among groves of oranges, lemons, figs and other vegetation similar to that of California. We are now in the sub-tropical belt of Mexico. Gaining the still higher land of the plateau, we reach the temperate belt, where we are a mile or more above the sea. Here fields of corn, beans and potatoes and orchards of temperate fruits thrive. The plateau is too cold for the orange and similar fruits.

In Mexico we find the vegetables and fruits of our own land growing far to the south of where we would expect them, because the land is high, and for this reason has a climate very much like ours, although it is within the tropics.

HOW CAN WE EXPLAIN THE FACT THAT IF WE TOOK A SUMMER TRIP TO ALASKA WE WOULD FIND THERE FRESH VEGETABLES, WHILE IF WE TOOK A SIMILAR TRIP UP THE EAST COAST OF AMERICA WE WOULD NOT BE ABLE TO SECURE FRESH VEGETABLES MUCH FARTHER NORTH THAN NEW FOUNDLAND?

The pioneer miners in far northern Alaska often suffered because they could not procure fresh vegetables. Fresh meat and canned goods will not keep people in good health.

Although the summers are short in the far north and the sun does not climb very high in the sky, yet the days are long and the plants take advantage of this and grow very fast. There are many flowers and some wild berries that are edible.

Seeing how quickly the wild plants bloomed and matured their seed in Alaska, different varieties of our garden vegetables were tried there and the results were surprising. Lettuce, turnips, beets, radishes and other hardy varieties thrived wonderfully. Now the dwellers in Alaska are quite well supplied with all the quick growing vegetables.

Some varieties of grass have been found to thrive in the valleys of Alaska. A quick growing barley is grown almost as far north as root crops, so that now cows can be kept there. Life in this far northern land is not nearly so hard as it once was.

If you went north from Newfoundland along the Labrador coast, you would soon find yourself looking onto a des-

olate and barren land. Trees disappear and only a little stunted grass manages to grow in the narrow valleys between the rocky ridges.

Look now at the map and you will see how much you lack of being as far north as where you were in Alaska when you had fresh vegetables and radishes for dinner. What is the reason of such a wonderful difference in the two northern coasts of America in the same latitude?

Winds from the Pacific ocean blow over Alaska just as they do over California. They bring moisture and they make the winters milder in the far north just as they do in California.

The winds that blow over the Labrador coast in summer bring little moisture. They are cold late in the spring because of the vast snow fields in the interior. The ocean winds of Alaska are mild because they blow across the Japan current (a current of warm weather from the south). When the winds of Labrador blow off the ocean, they are cold because a cold northern current carrying floating ice moves south along the coast.

JUDGING FROM THE PHYSICAL MAP, THE LAND ABOUT HUDSON BAY IS LOW AND WELL WATERED AND OUGHT TO BE A GOOD FARMING REGION, SINCE THAT PART OF EUROPE ABOUT THE BALTIC SEA, IN THE SAME LATITUDE, IS INHABITED BY MILLIONS



A mountaineer's cabin. Describe what the picture shows.

OF FARMERS. WHAT IS THE REASON THAT THE HUDSON BAY LOWLANDS ARE INHABITED ONLY BY ESQUIMAUX AND INDIANS?

It is possible to grow some root crops at the extreme southern end of Hudson bay, but as we go northerly, upon either shore, the stunted forest trees soon disappear and we find ourselves in the Barren Lands. The Indians do not go farther north than the forest, but about the shores of the Arctic ocean we come upon Esquimaux, who depend almost entirely upon hunting and fishing, though in summer they go far enough south to get birds' eggs and berries.

Now, let us visit Europe and the lands about the Baltic sea. As we sail northwesterly towards its head, we discover the lands on either hand are low and forested. If we go inland at any point about this great body of water, except at its extreme northern end, we shall find a densely peopled country. There are great cities, some containing almost a million inhabitants. There are great fields of rye and barley, and many pastures filled with dairy cattle, while beets, potatoes and other root crops are raised in abundance.

How can it be possible that the Hudson Bay region is so barren and almost without people, while the Baltic region, the same distance from the equator, is filled with millions of farmers who make a good living?

What we have already learned in our study of California and of Alaska will help us to understand this question also. The physical map of Europe shows that the Baltic sea and the lands about it are open to the moist west wind which brings frequent storms. There are no mountain ranges to cut off these winds before they reach the heart of Europe.

Turning now to America, we find ranges of lofty mountains, some of them the highest on the continent, lying directly across the path of the mild west winds that blow off the north Pacific ocean. On the Alaska coast there are only a few days of sunshine during the year. About Hudson Bay the rainfall is light because there are high mountains between it and the Pacific ocean. The bay region is also much colder than it would be if there were an opening through the mountains, as there is in Europe. These are the reasons why the Hudson Bay region is being avoided by the farmer and is occupied only by its native inhabitants and an occasional white hunter, trapper or prospector.

CHAPTER 14.

WEST OF THE GRAIN BELT AND EXTENDING TO THE FOOT OF THE ROCKY MOUNTAINS IS A BROAD STRETCH OF COUNTRY WHICH IS MUCH LIKE THE PRAIRIES IN APPEARANCE, ONLY THAT IT IS DRIER AND HIGHER. THIS REGION IS MORE THAN THREE THOUSAND MILES IN LENGTH, REACHING FROM THE NORTH IN BRITISH COLUMBIA SOUTHWARD ACROSS THE UNITED STATES AND INTO MEXICO. FARMERS SETTLED IN PARTS OF IT AND TRIED TO GROW CROPS, BUT THEY FAILED AND ABANDONED THE COUNTRY. IN PLACES THERE IS COAL, BUT THIS DID NOT HELP THE FARMERS. THE LAND WAS NOT ONLY DRY, BUT THE HIGHER PARTS WERE TOO FROSTY FOR CROPS. WHAT WAS IT GOOD FOR?

The region of plains and rolling prairies, as one travels over it, seems boundless, but it is not a desert. In the spring it is gay with flowers and supports a good growth of wild grasses. Upon this great pasture or range once fed millions of buffalo, elk and antelope. As these animals disappeared through the cruel waste of the hunter, cattle and sheep were brought in from the East. They thrived on the grasses and soon stock ranches were established throughout the length of these grass lands.

Ranch houses and corrals of logs were built, and the cattle and sheep were allowed to range for miles in every direction, without any fences to enclose them. Cowboys rode the range to keep track of the cattle. The herders took the bands of sheep, and with their donkeys and faithful dogs wandered over the range for months at a time.

The cattle were "rounded up" but twice in the year, once to brand the calves, and again to pick out the steers fat enough for market. Then came the long drive, often hundreds of miles, to the nearest railroad.

Life on these stock ranches was a wild and often exciting one. Sometimes Indians or white thieves stole the cattle. Sometimes there were fierce blizzards in winter, when, unless the stock were herded in some protected place, great numbers

perished. Some of the ranches raised hay for winter feeding, but in most cases the cattle had to depend upon themselves to find their food.

We usually think of people who live on a ranch as having all kinds of fruit and vegetables and as being supplied with fresh milk and butter, but if you had visited a cattle ranch of the early days you would have found none of these things. There were no gardens and the cows were all too wild to be milked. The average cowboy would not think of milking a cow. There was, of course, fresh meat, but all other provisions were shipped in.

Wherever cattlemen and sheepmen had ranches near together there was pretty sure to be trouble, for cattle will not feed where sheep have been. Few of the stockmen or sheepmen owned land, simply grazing their stock on the government lands, and so "might made right" in the troubles between them. Unless there came severe droughts or unusual winter storms the stockmen made money and grew wealthy.

WHO DO YOU THINK HAS THE ADVANTAGE IN RAISING CATTLE, THE EASTERN FARMER OR THE RANCHER OF THE PLAINS?

The life on a western stock ranch is a free one, but there are many privations, because these ranches are usually far from town and the country must remain very thinly settled



A cattle range in the Arkansas river valley. Note the few stunted trees even close to the river, showing that the region is very dry.

in order to keep the range for the stock. As we have seen, many cattle are lost because they do not receive proper care in winter. On a great stock ranch just one thing is commonly raised, and that is either cattle or sheep. The ranches usually consist of many thousands of acres.

An Eastern farmer may have a hundred acres. A part of this is meadow, a part grain or corn land, a part garden and orchard, and another part a combined wood lot and pasture. There are neighbors near by and it is nowhere very far to a town or city, while the roads are usually good. The farmer may also have electric lights and a telephone. He takes no chances about his stock suffering in the winter time; the barns are snug and well filled with hay and corn, but he has the disadvantage of having to keep up his stock and feed them for half the year, while on the great ranches the stock hunt their own food most of the time. The Eastern farmer works very hard during the seasons of planting, cultivating and harvesting his crop, but does not have much to do during the winter. A



Holstein cattle give the largest quantities of good milk. In the background is a field of corn which is to be used for silage for the cattle to eat. It will be packed away in one of the tall round towers which we see scattered through regions of dairies.

large part of his work is in raising enough feed for his stock to eat during the winter.

The Eastern farmer has the advantage of being nearer market than the rancher, and of always being able to sell his stock in good condition.

WHAT IS HAPPENING TO THE INTERESTING COWBOY AND THE GREAT RANCHES WHERE HE LIVES?

Back of the great plains, plateaus and mountain valleys, where the cowboy makes his home, are the rocky mountains, streams from which descend to make the great rivers, such as the Missouri, Arkansas, Rio Grande, Colorado and Columbia.

Much of the land once occupied by the great stock ranches is very fertile and lacks only water to make it bear abundantly. Finally people began to ask—Why not make dams and reservoirs in the mountains, and by means of canals, carry water to the dry lands? Many reservoirs have already been built. Where once one could travel all day and see only one or two cattle ranches, there are now thickly scattered homes and occasional villages. The water enables the new farmers to grow alfalfa, keep their stock in small fields and produce feed for many times the number of animals on a hundred acres than formerly could get a living from them. These farmers raise gardens, orchards, have milk and butter and are far more comfortably situated than the early day stockman.



Sheep grazing in a forest.

CHAPTER 15.

A HUNDRED YEARS AGO, BEFORE THERE WAS ANY LUMBER INDUSTRY, OUR ANCESTORS IN THE EASTERN HALF OF THE CONTINENT WERE DOING THEIR BEST TO CUT DOWN AND BURN THE FORESTS IN ORDER THAT THEY MIGHT HAVE ROOM FOR FARMING. WHY IS IT WE NOW FEAR THAT IF WE DO NOT TAKE GOOD CARE OF THE FORESTS THAT THE LUMBER INDUSTRY AND THE INDUSTRIES WHICH DEPEND UPON IT WILL DISAPPEAR?

The early story of the English people upon North America is one of a struggle to clear away the forests which covered the parts in which they settled. For a long time each man built his own home, either of rough logs or of hewn timbers. For boards and shingles, logs of a straight grain were split and shaved down to the size wanted.

By the time saw mills were built and run by water power, a large part of the forest in the older settled parts of the continent had been cut down and burned. Behind the settlements in the more remote districts, the primeval forest still remains. It was difficult to haul out the logs and so the streams were made use of. The Eastern streams do not flow so swiftly as our mountain streams. The logs are cut during the winter, hauled on sleds to the river banks and then in the spring, when the ice breaks up and the waters rise, they are floated down to the saw mills near the coast or large city.

The region all about the Great Lakes was once heavily forested, and for many years this was the center of the lumber industry in America. The waterways afforded by the Great Lakes, canals and rivers made it possible to send the lumber wherever it was needed.

Now these forests are nearly gone and the lumbermen have gone elsewhere. The forests of the southern Appalachian highlands were for a long time beyond the reach of the lumbermen, as were those on the coastal plains of the South Atlantic and of the Gulf States.

Now railroads are being built into the heart of the southern Appalachians and the great mountainous region about Mt.

Mitchell, the highest peak in the eastern part of the continent, is being robbed of its forests.

The finest pine forests of the continent are those upon the Pacific slope, especially in the State of California and Washington. Nowhere else in the world are there such wonderful pines, spruce and fir forests.

**FROM WHAT FAR REMOTE PARTS OF THE CONTINENT
DID THE WOOD COME THAT HAS BEEN MADE INTO
THE DIFFERENT ARTICLES IN YOUR HOME?**

The wood used for the most part in the building of our homes is pine, spruce and fir. These trees like a cold climate and plenty of moisture. They grow higher on our mountains and farther north than the hardwoods. The Canadian forests are composed largely of these trees. They are found in the higher parts of the Appalachian highlands, throughout its whole length. Some pines are not particular about the soil they have, and so we find fine forests that supply vast quan-



Three sleds of red and white pine, Minnesota.

tities of resin and turpentine growing upon the sandy soil of the South Atlantic and Gulf Coastal Plain.

The cedar shingles on the roof probably came from Oregon or Washington, where giant cedars are scattered through the forests of pine and spruce.

Your cedar chest may have come from Southern swamps, where, in company with cypress and clinging vines, it helped form almost impenetrable jungles.

The rosewood or mahogany, which is so costly and usually used only as a veneer upon various articles of furniture, came from some tropical forests in Central America, where the jungle is so dense that axes have to be used to open a path to the trees.

The walnut, which we use so much for furniture, grows all through the Appalachian region. Years ago, the settlers cut and burned great walnut trees that today would be worth hundreds of dollars each.

The hickory handles of various tools come from the same region as the walnut, and like the latter, this wood is becoming very high priced, because the trees have been so nearly cut away.

The oak is the chief hardwood of California, and we all know what beautiful groves it forms in most of the valleys. California oak is not considered of much value except for firewood, so that the oak furniture, tool handles, etc., come from States about the borders of the Ohio valley.

Redwood, of course, is found only in California, and the sugar pine used in windows and doors is also a California tree.

WHY IS IT THAT THE FACTORIES FOR MAKING FURNITURE AND THE WOODEN PARTS OF IMPLEMENTS ARE FOUND LARGELY IN THE GREAT LAKE AND UPPER OHIO VALLEY STATES?

All the region about the upper Ohio river valley was once covered with forests in which such hardwood trees as maple, oak, walnut, hickory and ash abounded. In the more remote districts these trees are still found in large numbers.

The region of which we are speaking has an abundance of coal and gas for running machinery. It is noted also for its manufactories of iron, which in combination with hardwood parts is used in many implements and tools.

The facilities for getting the raw wood and for shipping

away the furniture and other articles is the best possible. Why?

**WHY IS IT THAT WE ARE NOW WORKING AS HARD TO
SAVE THE FORESTS AS OUR ANCESTORS WORKED TO
DESTROY THEM?**

We have learned many things in the last 100 years. We have learned how the forests hold back the waters on the mountains and so lessen the damage from floods. In the Appalachian region great loss has come to the farmers through the cutting of trees on the hill slopes, for this has allowed the rain to wash away the surface and cut deep gullies in it. The lower valleys about the Appalachian highlands have been flooded and farms greatly damaged since large areas of forests have been cut away.

All through the Central and Eastern States the streams are lower in summer than they were and the spring floods are worse. California has suffered some from the same trouble, but we are waking up in time to save our slopes and the surplus water so much needed for irrigation.

The Government has acquired large acres of land in the Appalachians for the purpose of preserving the remaining forests and reforesting the cut over slopes. It has acquired the



Planting yellow pine stock on the Pike National Forest, Colorado.

White mountains in New England for the same purpose. Many of the Eastern States are setting aside large areas of uncut timber for a permanent forest, and are also replanting many waste and desolate areas which are not suitable for farming, but will grow a fine forest.

There are many great National Forests in California and many other Pacific Coast States, as well as in Alaska. In the Rocky mountains there are also other National Forests.

These forests are managed quite differently from the National Parks. In the parks everything is left just as nature made it; the trees, the flowers, animals and birds are protected. The National Forests are open as playgrounds as well as the parks, but the wealth that they contain may be used only under direction of foresters. The cutting of trees is regulated so as to keep up the supply by careful selection and guarding against fires.

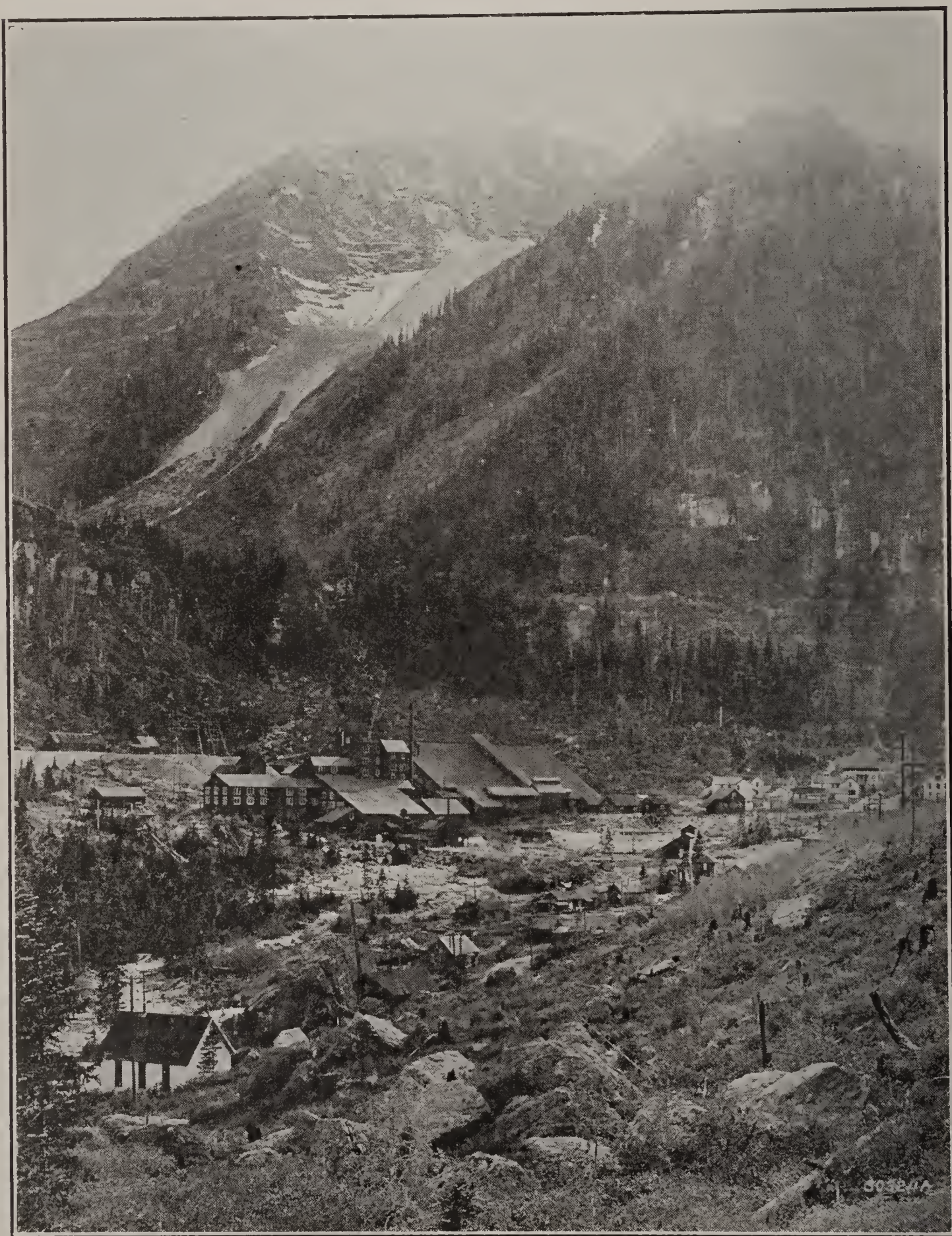
IN WHAT WAY WAS IT AN ADVANTAGE THAT OUR NEW ENGLAND FOREFATHERS HAD TO MAKE THEIR OWN CLOTHING, HOUSEHOLD ARTICLES AND FARMING TOOLS?

Did it not make them skilled in the use of their hands? Did it not cultivate ingenuity in making the things they need-



Sowing seed along contour lines on slopes, Pike National Forest, Colorado.

ed, as well as make themselves reliant? Most of us, if lost in some wilderness, would be almost helpless. We would not know how to start a fire, to secure food or to cook it. We might suffer a great deal before we learned how to make anything wherewith to clothe ourselves, or to build a shelter from the storm.



A mining camp in the mountains of Colorado

Our forefathers became skilled in everything which contributed to their comfort in a land where very little could be bought at a store. The few manufactured articles that could be obtained had to come a long distance across the ocean and were very high priced, while the people who needed them could get them only by trading skins or furs, as they had very little money.



This is a copper smelter and the town that grows up around it in a desert valley in Arizona. A smelter is an establishment where a metal is obtained from its crude ore. Note the pipe for carrying away the poisonous fumes.

CHAPTER 16.

WE WOULD NATURALLY EXPECT MANUFACTURING TO BECOME IMPORTANT IN THOSE PLACES WHERE THERE WERE RAW MATERIALS CLOSE AT HAND, BUT NEW ENGLAND, WITH LITTLE RAW MATERIAL OF ANY KIND, HAS BECOME ONE OF THE GREATEST MANUFACTURING CENTERS IN THE WORLD. HOW COULD THIS UNEXPECTED THING HAVE TAKEN PLACE?

In the first place our New England forefathers had become skilled workmen through having to make their clothes, shoes, clocks, tools, etc., by hand. We all know what beautiful hand work of all sorts is made by the people of the half civilized nations scattered over the world. They have no machinery and have learned to make articles which we are willing to pay a good deal more for than for machine made ones.

The New England region has no coal, except a little away up in Canada, and very little iron or other metals. However, it has many streams that flow swiftly down to the ocean. Being of an inventive turn of mind, many of the men set up water wheels and built little mills, where the corn and barley raised in the neighborhood could be ground. Then they thought of turning the water power to advantage for other purposes. They began to devise machinery for the purpose of weaving cloth, and to their home-made inventions was soon added more elaborate machinery brought from England.

Little by little, machinery for saving labor in other industries was invented. Iron and coal were obtained from Pennsylvania and articles too numerous to mention were manufactured in ever greater quantities, as a market for them was found.

New England did not supply much leather for boot and shoe making, and so leather was obtained from other lands where there were many sheep and cattle.

Cotton was found to do well in the South, and soon New England became the market place for a large part of the cotton grown there.

**COULD NEW ENGLAND HAVE BECOME A SUCCESSFUL
MANUFACTURING CENTER IF IT HAD HAD ONLY WA-
TER POWER AND SKILLED WORKERS?**

If we look on the map of the North Atlantic States we shall see that the coast has many bays extending far into the land. Most of the factories have been built upon these bays, or on the streams which empty into them. Their location makes it very easy to bring raw materials by water and to ship away the manufactured articles.

Large factories require a great many people to handle the machinery, and so they must be built where workmen can be had and where these workmen can get food and other supplies cheaply. Just think how differently the story of the Northeastern States would have been if they had had a surface and streams like those of California. Our streams flow gently through the Great Valley and offer no water power where it would be easy to build factories and towns. It would have been very difficult, and in most places impossible to have built factories or mills in places like our far-away mountain canyons, where water power is to be found.

If the eastern coast of North America had been like the Pacific coast, and the Pacific coast like the Eastern, the United States would probably not be noted for its manufacturing industries.

These things show how our work is determined by Nature. When we go to a country to live, we have to do what Nature says we may; otherwise we cannot succeed. Our forefathers were, however, at a disadvantage, because they did not know as much as we now know about how to make use of Nature. Now we can carry the water power by means of electricity to any place we choose, where there is good transportation and where the workers can make comfortable homes.

**IN WHAT WAY DID NATURE ARRANGE MATTERS SO
THAT THE MANUFACTURING WHICH GREW UP IN
THE MIDDLE STATES WOULD BE OF A DIFFERENT
SORT FROM THAT OF NEW ENGLAND?**

It is curious that we arrange our work, when we are successful, as Nature had planned that we should, and without ever thinking anything about it.

The metal manufacturers of New England make chiefly small delicate articles which need the least amount of material and require great skill. The manufacturers of the Mid-

dle States and the Ohio valley confine themselves chiefly to heavy, bulky and coarse manufactures of iron. The reason for these great differences in the industries of the two regions is that New England is some distance from supplies of coal and iron, while the region of which the Ohio valley is the center is close to them.

Great coal fields are worked in these States, while in addition there is petroleum and natural gas. While the iron is mined chiefly in northern Minnesota, it is so easily and cheaply brought to the coal fields for smelting that we might consider it as really at their door. Huge barges take on the ore at Duluth and bring it down through the Lake waterway to Chicago, Cleveland and other cities. Here, a part is smelted, while another part is taken by cars to Pittsburgh, which is the greatest iron manufacturing place in the world.

Not only is iron smelting carried on in this region, but many different kinds of articles are made from the crude, or pig, iron. The manufacture of heavy machinery of every description, automobile parts, agricultural machinery, iron rails, etc., takes immense quantities of iron.

Copper is mined on the southern shore of Lake Superior, where is found the deepest mine in the world. Zinc is mined in Missouri, and both copper and zinc are found in the Rocky mountains. These metals are also used in many manufacturing processes.

IN WHAT RESPECTS DO THE SHIPPING FACILITIES OF THE OHIO VALLEY STATES ENCOURAGE MANUFACTURING?

We cannot picture any region better situated for shipping products than that which we are now studying. The Ohio and Mississippi valley waterways are being improved and more freight is now going to the ocean that way. This is due partly to the deepening of the water from the Gulf to New Orleans, and partly to the opening of the Panama Canal.

The Lakes and Erie canal waterway has long been the most important outlet, although the improvement of the St. Lawrence route will take more freight that way. Chicago is now connected by canal and the Illinois river with the Mississippi river, and canals may again open up a freight route between Lake Erie and the Ohio river.

From what we have learned, it is not surprising that the

Central States of the Ohio and Mississippi valleys, and those bordering upon the Great Lakes, are not only among the richest farming districts of the continent, but also have become as important in manufacturing and trading industries as the New England States.

LEARNING WHAT WE HAVE ABOUT THE FARMING, MANUFACTURING AND COMMERCIAL ADVANTAGES OF THE CENTRAL STATES, ARE WE AIDED AT ALL IN UNDERSTANDING WHY THE GREAT MEAT PACKING INDUSTRIES OF NORTH AMERICA ARE CENTERED IN CHICAGO, OMAHA, KANSAS CITY AND OTHER NEAR-BY PLACES? WHY SHOULD THERE NOT BE SIMILAR INDUSTRIES UPON THE ATLANTIC COAST?

The great cities of the East, with the great number of smaller cities and towns about them, require every day far more fresh meat than can be produced upon the farms of that region. We must take into account also that near these cities there is more money in fresh butter, cream and milk than in beef and pork.



The Mississippi River forms the great natural highway from north to south across the United States. Thousands of steamers are engaged in carrying freight and passengers upon thousands of miles of water of this river and its tributaries.

The Western cities which we have mentioned are in the center of the corn and hog belt where far more animals are raised than can be consumed in a fresh condition. Besides this, the many railroads that run west across the great plains and the region of the cattle and sheep ranges can quickly and easily bring the animals to the Mississippi valley, where there is an abundance of cheap corn and hay for fattening them. We can readily see there are many other reasons why the packing industry should grow up where it has rather than close to the ranches, or in the more distant Atlantic coast region.

WHAT IS THE REASON THAT, EXCEPT FOR THE PACIFIC COAST, THE REGION OF THE WESTERN HIGHLANDS IS ALMOST WITHOUT MANUFACTURING INDUSTRIES OTHER THAN THOSE CONNECTED WITH MINING?

There is an abundance of coal in the Rocky mountain region. There is also petroleum, great forests and enormous water power, but no manufacturing except the smelting and refining of gold, copper, lead and zinc ores that are mined there.

In the first place, the whole region is, for all practical purposes, dependent upon railroads for its outside supplies and for sending away its produce. The many great rivers which



One of the greatest silver camps in the world.
Leadville N. F., Colorado.

rise there are of very little value for transportation as compared with those of the central and eastern parts of the continent.

The Missouri is the only branch of the Mississippi river rising in the Rocky mountains that is navigable for any distance from its mouth. Boats ascend this river to Great Falls, pretty well up towards the base of the mountains. Huge plants for treating the ores mined in the nearby mountains have been built there.

The Arkansas river has such a broad sandy channel that it has never been of much value for navigation. The early trappers returning from the Rocky mountains to St. Louis tried to use this river to transport their load of furs, but it was too shallow for their loaded canoes.

The Rio Grande is another of the rivers of the Rocky mountains; it flows southerly and then easterly, forming the boundary between the United States and Mexico for some distance before reaching the Gulf of Mexico. Its bed is broad and sandy and unfit for navigation.

We are hearing now much about the Colorado river and the enormous possibilities which it offers, both for irrigating the deserts through which its lower course lies, and as a source of electric power. The seven States which its waters touch or flow through are drawing up a plan to divide the water and power among them.

Since the river possesses enormous power for work, we conclude at once that it is not, and never will be, of any value for navigation. The greater part of its course is through a canyon so deep and rugged that only two parties have ever succeeded in going down the river from its upper waters to its mouth.

Since the river is of no use for navigation and trade, it can aid manufacturing only through the power which it affords. The mouth of the river, in the Gulf of California, is very interesting, but at the same time dangerous for boats, even of large size. A great "bore" caused by the tide ascends the lower part of the river when the tide comes in. The waves of this bore are sometimes over twenty feet high, and recently overturned a steamer which was bringing laborers to the cotton fields of the delta.

The Columbia river and its main branch, the Snake, offer stretches of quiet water where local steamers ply, but there

are waterfalls and rapids which seriously interfere with continuous navigation. These rivers, as we might expect, offer great opportunities for electric power.

Those far northern rivers, the Yukon, in Alaska, and the McKenzie, in the Northwest Territory, are valuable for navigation in the summer, but are frozen up during eight months of the year.

Manufacturing is becoming important on the Pacific coast, because of the ocean highway, the great cities that are growing up there, the abundance of petroleum for fuel, the electric power from the mountain streams, and the mild, healthful and pleasant climate which is drawing people from all over the world.

We cannot expect the interior of the Western highlands to ever become noted for its manufacturing industries because of the lack of cheap water transportation, the cost of living and the long distance from markets.



Celilo Falls, Columbia River. The presence of rapids and waterfalls make continuous navigation of the Columbia River impossible until locks are built. Note the barren character of the country.

CHAPTER 17.

ALTHOUGH THE FARMERS OF THE NORTHEASTERN STATES CANNOT RAISE GRAIN OR STOCK AS CHEAPLY AS THE PRAIRIE FARMER, YET HAS NOT THE GROWTH OF THE GREAT CITIES IN THIS PART OF THE UNITED STATES, WITH THEIR MILLIONS OF PEOPLE TO BE FED, GIVEN THE EASTERN FARMER AN ADVANTAGE AFTER ALL?

When the fertility of the prairie lands first became known and the New England farmers, who could do so, went West, the Eastern cities were small and there was little demand for country produce. Now there are millions of people connected with the countless factories and millions of others who are engaged in different occupations. All these people have to be fed, and depend upon the farmers.

The city people want fresh vegetables every day; they want fresh milk and butter, small fruits and berries, the most of which, in order to reach the table in good condition, must be grown close to hand. The fertile lowlands along the rivers and near the coast are now given over to market gardening. The rocky hill slopes where once the farmer could hardly raise enough in the summer to last him through the winter, now support countless dairies, for the rocks do not interfere very much with pasturing.

The farming operations have therefore greatly changed throughout all the Eastern States to suit the demand of the great cities. We can see the same thing here in California. If we take a ride through the country about San Francisco or Los Angeles, we may see what is required in the vegetable, berry, fruit and dairy lines to give the people of a large city the fresh foods that they need. These industries are carried on as near the cities as possible in order that the produce may be taken on trucks to the wholesale market in the early morning.

The railroads which branch out from every city afford opportunities for dairymen to keep their cows many miles out in the country and yet get their milk to the city in fresh condition.

We might say that the whole farming industry of the Northwest and Eastern States has been made over because of the needs of the great cities of the region.

DO THE NEEDS OF THE GREAT CITIES OF THE EAST AFFECT THE WORK OF ONLY THOSE FARMERS WHO LIVE NEAR THEM, OR DOES IT REACH CLEAR ACROSS THE CONTINENT?

Because of the long winters in the north, it is late in the spring and almost summer before the fresh vegetables and berries raised there reach the market. As we go south, spring comes earlier and earlier, and by the time we have reached southern Florida we find fresh grown vegetables in the market the year round.

Because of the good water communication with Northern cities, the market gardeners have taken advantage of the early season in the South to send the North fresh produce, while the latter region is still cold and snowy. As spring comes on, gardeners living all the way up the coast to New York send their produce north, one after the other, until the regions about these northern cities are able to send to market the things wanted.

Even far away California supplies many early vegetables and fruits for the Eastern market, particularly such things as thrive better here than upon the South Atlantic coast.

Imperial valley ships early lettuce, cantaloupes, tomatoes and table grapes to the Eastern market. Early cherries and apricots are shipped from the warm slopes under the Coast ranges in the Sacramento valley. Through the use of refrigerator cars, these and many other vegetables and fruits go East in large quantities and arrive there in good condition.

JUDGING FROM THE MAP ALONE, WHERE OUGHT WE TO FIND THE GREATEST CITIES OF THE CONTINENT?

Should they not be situated where there are the best opportunities to ship to other lands the home products and to receive other products in return? San Francisco ought to be one of these, because of its great bay and large valley lying back of it. New Orleans ought to be another, because it is situated at the mouth of the greatest river which drains the greatest lowland. New York ought to be a third, because of its harbor, while Chicago should be the largest interior city.

In answering this question, we have been guided partly by the climate, for if the Gulf of St. Lawrence were further

south, where the winters were less severe, one of the greatest cities of the continent should be looked for upon it.

WHY IS IT THAT PHILADELPHIA, ALTHOUGH IT HAS A MOUNTAIN BARRIER SEPARATING IT FROM THE OHIO AND MISSISSIPPI VALLEYS, WAS ONCE THE LARGEST CITY IN THE UNITED STATES, AND NOW RANKS ONLY THIRD IN SIZE?

Philadelphia was once larger than New York. It lies upon a navigable river a few miles above the head of one of the largest bays on the Atlantic coast. It lies in the midst of a fertile farming region and is on the land highway between the North and the South.

To the west of Philadelphia are the valuable anthracite coal fields, and farther west, in the same State, are bituminous coal fields and petroleum deposits. We would naturally expect that import manufacturing would grow up about the city.

But after all, Philadelphia lacks easy communication with the vast farm lands of the Mississippi and Ohio valleys. This is the reason that it did not remain the largest city on the continent. It is because New York is at the Atlantic end of an easy land and water route to the interior that it has become the first city in importance.

WHY DO THE PEOPLE OF NEW YORK CITY OBJECT TO OUR COUNTRY JOINING WITH CANADA AND HELPING OPEN THE GREAT LAKES WATERWAY DOWN THE ST. LAWRENCE?

Most of the freight and most of the travel between North America and other lands goes through the port of New York. We have more to do with Europe than with any other continent, and New York lies upon the direct route.

While small boats can now go from Duluth, the great wheat shipping port on the Lakes, down to Quebec by means of canals around the falls and rapids, this is not enough. It is proposed to enlarge the canals so that ocean-going boats can reach Duluth and other Lake ports and load their cargoes direct for Europe without change. This would save quite a bit of expense.

It is proposed to make this a joint waterway for Canada and the United States, but New York City objects, because it would take away from that port a large amount of freight which now reaches it by means of the Erie canal. What do you think about this? How do you think the farmer feels

about this proposed canal? Will it be of advantage to him? Would it affect the California farmers?

CHICAGO IS SITUATED UPON WHAT WAS ONCE LOW, MARSHY GROUND AT THE HEAD OF LAKE MICHIGAN. HOW IS IT THAT IT HAS BECOME THE LARGEST IN-LAND CITY OF THE CONTINENT?

Although Chicago is low and was once not a very pleasant place to live, yet its position gives it such remarkable advantage that it could not help but attract great numbers of people, and it has grown more rapidly than any other of the large cities of the land.

Its position on Lake Michigan made Chicago a favorite place for the early travelers to camp, since with a short portage they could reach the Illinois and Mississippi rivers.

Land travelers from the Northwest to the Ohio Valley had to go around Lake Michigan, and therefore past the spot upon which the city is located. Freight from the South for the Lake region naturally was taken to Chicago and there put on boats. To make trade easier with the Mississippi, a canal was built connecting with the Illinois river, but this is not at present much used. Later, the Chicago Drainage Canal, at a level of the Lake, was dug to help take care of the sewage of the city.

The situation is convenient for iron manufacturing, since the ore can be landed there cheaply and coal can be brought from the mines, a little distance away, by railroad.

The demand of the rich farming region, of which the city is the center, led to its becoming the center for the manufacture of agricultural machinery.

The huge crops of corn and other grain raised near by, taken together with the shipping facilities, led to its becoming the greatest meat packing center.

Railroads now extend out in every direction, like the spokes of a wheel, and reach all parts of the country.

Waterways lead away in two opposite directions. In truth we cannot think of any finer situation for a great city. Are the rivers and lakes in the Eastern half of North America of any particular value to the people of California?

Do we make use of these waterways in shipping products to the Eastern markets or in getting manufactured articles back? The longest part of the distance to New York,

Philadelphia or Boston is between California and the Mississippi river. In this stretch of country there are no navigable rivers.

It would not pay to transfer our products to boats when they reached the Mississippi river at Chicago. To make sure of their arrival in good condition in the Eastern coast cities, these products must be carried as quickly as possible in refrigerator cars.

Goods for California from the East might be shipped by water as far as the Mississippi river, but it is better to send them all the way by railroad. The cheaper way, if the articles are heavy and we are not in a hurry for them, is to send them to New York and there have them shipped by steamer to Los Angeles or San Francisco, by way of the Panama canal.

WHY DO MOST OF THE MAIN LINE RAILROADS OF NORTH AMERICA RUN IN AN EASTERLY AND WESTERLY DIRECTION, RATHER THAN NORTHERLY AND SOUTHERLY?

We must not forget, of course, that there is an important trade between the hot lands of the South and the cold lands of the North, for in each region are grown fruits, etc., which the other lacks. The most of this trade can be either carried on by means of the Mississippi river or the Atlantic ocean.

The earlier explorers traveled West. More people now travel east and west than north and south. The goods from Asia for the Eastern States and Europe go *east*. Manufactured products of the East and of Europe go *west* to reach the Pacific Coast. Because of these things all the early railroads were built towards the West, in the direction in which people were moving with oxen and horse wagons, when they could go no other way. There are about six main lines of railroad by which we may go East from the Pacific Coast of the United States. Two other lines cross Canada in an east and west direction. We can go north from California by only one railroad, and southeast into Mexico by two. Why do we go to Alaska by boat rather than by land?

People travel around the world more commonly in an east and west direction, partly because most of the countries with which we have relations and do our trading, lie either east or west. South America is the chief land to the south with which we deal.

CHAPTER 18.

WHAT ARE THE ADVANTAGES WHICH OUR COUNTRY ENJOYS AND WHICH HAVE HELPED MAKE IT THE GIANT POWER OF THE NEW WORLD?

A. The People of the United States.

Most of the people of the United States are the descendants of emigrants from western and northwestern Europe. They were among the most ambitious of the people of their native lands, or they would not have braved the dangers and trials of going to a far away land and making their homes here.

The people of the United States are a mixture of many different nationalities of Europe. The climate is cool enough to make them active and energetic, but not so cold as to make life too hard.

We ought not to be surprised that the best of the people of Europe have made the greatest and best country in the New World. This is a democratic country and has the best of educational advantages for its children.

B. The Advantages of Position and Boundaries.

The United States, except for its outlying possessions, lies wholly within the north temperate belt. Thus the greater part is neither very cold nor very warm. This favors our doing the most and best work and having also time to play.

The United States extends across the continent from east to west, facing on the the two most important oceans. It has besides a navigable waterway along a part of its northern boundary, and a great gulf on its southern boundary. The opportunities of the United States for trade by water with all the countries of the world is better than that of any other nation. If it were not for the frozen northern coast, Canada would be as well situated as our country.

C. The Natural Resources of the United States.

The United States possesses the largest, best watered, most accessible lowland of any of the continents. In addition,

this lowland has a climate which makes it wonderfully productive. The United States is better supplied with fuel, both petroleum and gas, than any other country. In the mountains, especially of the Western highlands, there are uncounted treasures of gold, silver, lead and zinc.

Nature gave the land occupied by the United States, forests which would have been inexhaustible had they been taken care of.

The agricultural products are wonderfully varied because of the great variety of climates.

The mountain streams offer water power as great as we can ever use.

D. Advantages for Trade and Commerce.

The United States has a great extent of coast line, the most of which is supplied with harbors. The United States is accessible by water from nearly every direction, while the eastern half is well supplied with navigable streams.



A valley in the Klamath Mountains. The chief industry here is mining. The bottom land has been washed away in order to get at the placer gold. In one corner is a sluice box for carrying water with which to wash the gravel.

The Atlantic coast faces Europe, with its supplies of manufactured articles and its need for our raw products.

The Pacific Coast faces on all the countries of the Pacific ocean in which there will be some day a market for all that we can produce, and from which we receive both fruits and raw products for manufacturing, and very attractive hand-made articles.

COMPARISON OF THE UNITED STATES WITH OTHER COUNTRIES OF NORTH AMERICA.

WHY ARE MEXICO AND CENTRAL AMERICA OCCUPIED BY SUCH BACKWARD PEOPLE, THOUGH THEIR COUNTRIES ARE BLESSED WITH A GREAT VARIETY OF NATURAL RESOURCES?

The native inhabitants (Aztecs) found by the Spaniards living upon the table-land of Mexico, were among the most advanced of the Indians. This shows that the region is favorable to the progress of people.

Mexico and the Central American States have, however, made but little progress as compared with the United States. The Spaniards were easy going and disliked hard work. A large part of the population is now of mixed Indian and Spanish blood, and as the Indians do not like hard work we should not be surprised at Mexico's backward condition.

The climate of the highlands is very healthful, although it is in the tropics. The climate of the region is also dry, so that irrigation has to be carried on. There are rich deposits of silver, gold, copper and zinc in the mountains. The coast lowland upon the eastern side, though hot and unhealthful, can be made healthful, as the United States has shown in the case of the Panama canal zone. These lowlands are wonderfully rich and productive and contain great quantities of tropical hardwoods.

The Pacific coast is not so wet as the Eastern coast. It contains a great extent of fertile but almost uncultivated land. Here are grown early fruits and vegetables, some of which, such as tomatoes, we see in the markets early in the spring, before our tomatoes are ripe.

WHY IS THE GREATER PART OF CANADA, A COUNTRY ALMOST AS LARGE AS THE UNITED STATES, ALMOST UNINHABITED EXCEPT IN THE SOUTHERN PART ALONG THE UNITED STATES BOUNDARY?

Canada is inhabited by people of English descent as well as by others from northern Europe, who are as progressive and energetic as we are. The distribution of the population is determined by the temperature.

We can make our homes in the tropics although born in a temperate climate, and be fairly healthy and prosperous, by taking care of ourselves. But where nature has made it too cold for farming to be carried on we cannot make any changes.

Mining and fur hunting have drawn men into the far north and northwest parts of Canada, but is only for money and not to make homes.

The St. Lawrence valley, the region of the lower Great Lakes and the grain region of the northern prairies, holds most of the people of Canada.

WHY HAVE THE WET EAST INDIES, WHICH POSSESS, ON THE WHOLE, A HEALTHFUL CLIMATE THOUGH IN THE HOT BELT, REMAINED SO BACKWARD?

The early Spanish conquerors set the Indians to work upon their plantations and through their cruelty soon killed them off. Then they imported negroes for this work, and now more than half the population of the Islands, as a whole, is negro. Cuba and Porto Rica contain a good many people of Spanish descent.

With a population of this kind, it is easy for us to understand why the people as a whole are so backward. The Islands are delightful places to go for a winter vacation, and a great many Eastern people take advantage of this, for they can reach them easier than they can California.

WE HAVE LEARNED A GREAT MANY GOOD THINGS ABOUT THE UNITED STATES. LET US NOW SEE IF IT HAS ANY DISADVANTAGES.

Highlands lie near both the eastern and western borders of the country so that most of the streams emptying into the Atlantic and Pacific oceans are navigable for only short distances. The highlands also interfere with access to the interior from both east and west.

The greatest river system opens southward and not in the direction of the greatest travel and trade. The northern rivers and bays are of little use because frozen over most of the year.

The outlet of the Great Lakes lies in Canada and is frozen up part of the year.

There are large deserts, upon many of which it is impossible to get water for irrigation.

WHAT INFLUENCES HAVE MADE THE DISTRIBUTION OF THE PEOPLE OVER THE UNITED STATES SO UNEQUAL?

1. The eastern portion has the densest population because:
 - a. The region was settled first.
 - b. The region is nearest Europe, from which most of the immigrants come.
 - c. A part of this region has rich farm lands, and all has a good rainfall.
 - d. Conditions were favorable to the early development of manufacturing.
 - e. Conditions favored the growth of commerce.
2. The Ohio and central Mississippi valleys stand next to the Atlantic slope in density of population.
 - a. These valleys contain a great area of fertile and easily cultivated land.
 - b. Underneath the surface in many places are deposits of coal and petroleum.
 - c. There are many navigable streams.
 - d. Raw materials, easy communication and cheap fuel favor manufacturing.
3. The mountain uplands still remain sparsely settled.
 - a. There is comparatively little good farm land in the mountains.
 - b. It is expensive building roads and railroads to ship products out.
 - c. Difficulty of access is unfavorable to manufacturing, though there is an abundance of water power and fuel.
4. The Great Plains and deserts have settled slowly.
 - a. The lack of rain has kept farmers away, except from those parts where water has been obtained for irrigation.
 - b. The occupation of cattle and sheep raising upon these dry lands demands very few people to carry it on.
 - c. Mining has drawn people into parts of the deserts.

5. The Pacific coast has settled rapidly.
 - a. This region contains much gold.
 - b. The region is suited to a great variety of plant products.
 - c. The outlet upon the Pacific offers great advantages for trade.
 - d. The climate is agreeable and healthful.
6. Rainfall and temperature have had a great influence in determining where people have made their homes.
 - a. Regions of moderate heat and cold and moderate rainfall have settled rapidly.
 - b. The farmers quickly settled areas where there were no forests to be cleared.
 - c. Regions of heavy rainfall and great heat settled slowly.
 - d. Regions of extreme cold settled slowly.
 - e. Regions with little water settled slowly.
 - f. Regions on lines of trades settled rapidly.
 - g. Regions with coal and iron settled rapidly.

PART III.

TOPIC:—THE LANDS BEYOND THE OCEAN, ABOUT WHICH WE HAVE HEARD MANY THINGS, BUT WHICH WE HAVE NEVER SEEN.

GENERAL PROBLEM.

To Find Out Why California Trades with Nearly All the Countries of the Great World, though it is Such a Complete Little World in Itself that it Could Get Along Very Nicely, if Necessary, with What it Produces Within its Own Borders.

INTRODUCTION.

We produce in California almost everything that we really need, yet our trade with people of other lands is very large. We can easily understand that most parts of the earth are not as fruitful as our land and why that people who live in those parts are very glad to obtain what we have to spare. But why do we want anything that they have?

Our previous work in geography has shown us that there are lands far to the north where the cold is so great that only a few food plants grow. There are other lands to the south where the heat and moisture are so great that our food plants do not thrive. There are lands where most of the people are engaged in other occupations than that of planting and harvesting and have to buy much of their food.

But food is not the only thing for which different peoples carry on trade with each other. The materials which one wishes to use in his clothing are not always to be obtained in the home land; neither are iron and copper and the thousands of articles in which these metals are used. Besides these things, there are fibers useful in many ways; there are dyes, precious stones and many other things that you can think of. Some of these are found in one part of the world and some in another. It is through trade that they are dis-

tributed so that everyone who wishes them can obtain them.

The people of each country have become skilled in making certain things. The Chinese and Japanese are noted for their wonderful porcelain dishes and vases. The Swiss are noted for their wood carving. The Italians are noted for their jewelry. The Persians are noted for their rugs. The Hindus are noted for their artistic metal work. The United States is noted for its farm machinery and automobiles.

When the people of one country learn of the pleasant tasting fruit, of the beautiful cloths, jewelry and wares of various sorts produced by the people of another country they go there to buy what they can of them, or give their own products in exchange. This is one reason why we Californians, who live in a land having such a variety of products, carry on so much business with the people of other lands.

CHAPTER 19

THERE MUST BE SOME AMONG THE MANY LANDS OF THE EARTH WITH A CLIMATE AND NATURAL PRODUCTIONS SIMILAR TO THOSE OF CALIFORNIA, WHERE SHALL WE LOOK FOR THESE LANDS AND IS OUR TRADE WITH THEM LIKELY TO BE VERY IMPORTANT?

To begin with, let us review some of the things we have learned about the climate and resources of California. Our State lies in the warmer part of the north temperate belt. It is a land of summer drought and winter rains. This means that irrigation is necessary to produce most crops. The prevailing wind is from the west. It must therefore come off the Pacific ocean. This makes the winters warmer and the summers colder than they would otherwise be. Mountain ranges cut off the cool moist wind, so that in summer the interior valleys are hot and dry. The high mountains are very cold and snowy and have an arctic climate. Thus it is that between the cool coast, the hot interior valleys and the cold mountains, we find growing a wonderful variety of fruits, grains and vegetables.

To find out what other lands there are, if any, that have a climate like that of California, we must learn something about the winds, in addition to knowing how far south or how far north of the equator the places are and how their mountains lie. Every sailor knows there are belts of wind that extend around the earth in an easterly and westerly direction and that the quickness or slowness of his voyage depends upon which belt he gets into. He knows also that these belts of wind do not remain in the same place the whole year, but that they move north when the sun comes north in the spring and south when the sun goes south in the fall.

The California farmer has learned that he is in a belt of westerly winds and storms during the winter, but as summer approaches the weather becomes dry because the storm belt has moved towards the north. A belt of changeable and light winds has come up from the south. This belt is called by that

strange name, the "horse latitude". If he could travel south across this belt he would come to the belt of the northeastern trade winds, where he would find rain again. If he kept on until the sun shone directly overhead at noon, he would find himself in another belt of calms. The belt instead of being dry like the "horse latitude" has almost daily showers.

Now, let us return to California. Our home land is in the southern edge of the belt of westerly winds and storms. When this belt moves south in the winter, we have rain. When summer comes, the belt has moved north. Rain falls in British Columbia, but we get none; and so we call California the land of "summer drought" or "summer sunshine".

Now let us take a globe or map and trace our course upon it, imagining that we are flying east with the west wind behind us. If there are any other countries that have a climate like California we shall find them. If we start from San Francisco, we shall reach the Atlantic ocean near Washington. If we start from Los Angeles in an easterly course, it will take us near Charleston. Either route crosses the Rocky mountains and the Mississippi valley.



This is a scene in southeastern Spain, the only region in the whole of the Mediterranean region of Europe where date palms thrive and produce good dates. You can see the bunches of dates hanging from the trees.

We have already learned why the interior of our country and the Atlantic coast to the east of California have a cold winter climate, too cold for oranges and other semi-tropical fruits. In this part of our country it rains in the summer so that the climate is altogether different from that of California.

Continuing the journey east over the Atlantic, the first land we come to is the southwestern tip of Europe and the northwestern tip of Africa. We will land at Gibraltar and explore Spain. The people and their language are strange, but their homes are not unlike many that we see in Southern California. There are so many other sights, however, that remind us of our home that we almost feel we are in another California. There are beautiful palms waving in the soft air. There are groves of orange, lemon and olive trees. There are vineyards with trays of raisins drying in the sun. There are irrigation ditches carrying water to the orchards and vineyards, which tell us more certainly than if we could talk with the people that the land we are in is a land of summer sunshine like California.

In winter the westerly winds and storms reach southern Spain. In summer the rain belt moves northward as it does in California, and a warm, dry belt comes up from the south to take its place. If we went into the interior we would find mountains, on the high slopes of which there are temperate fruits, just as upon the mountain slopes of our own land.

We continue our eastward journey through the Strait of Gibraltar. Upon our right rises the lofty Atlas range of North Africa. Should we land at any point upon the African shore, we would find a close resemblance in the vegetation there to that of California. But we must not stop, for there is the whole coast of the Mediterranean sea to be explored before we return. As we continue the journey eastward, the next land to come in sight is the great Island of Sicily. Here upon the slopes of the volcano of Etna are miles of vineyards and orchards of lemons and orange trees.

Now, the long peninsula of Italy lies across our course. Again we see a resemblance between the stucco houses, with their red tiled roofs, to many of the newer homes of Southern California. Orchards of semi-tropical fruit dot the country.

Beyond Italy lies the peninsula of Greece, where the rocky mountain sides are terraced to hold giant olive trees.

This land appears, like the other Mediterranean countries we have visited, to receive a light rainfall.

At the extreme eastern end of the great sea we come to Palestine and Syria. We find in the City of Jaffa the most delicious seedless oranges we have eaten since leaving California.

We have now made the circuit of the Mediterranean sea, with the exception of Egypt. This ancient land borders a part of the sea and extends so far south that the rains of the westerly wind belt do not reach it even in winter. Sometimes rain does not fall in Egypt for ten years, and there would be no green thing there were it not for the river Nile.

If we leave out of account Egypt and Tripoli, where ought we to look for the driest and hottest of the Mediterranean lands? Is not this land found in the southeast corner of Spain, where the high Sierra Nevada mountains cut off the west winds and where the hot winds of Africa are felt. In this warm spot are groves of date palms with their delicious fruit. How much the climate of this region must be like the Coachella and Imperial valleys in our own State, where the date palm also flourishes.

Because of the lack of summer rains, the lowlands about the Mediterranean support a scanty vegetation, just as do our California valleys. Hot winds sometimes blow from the Sahara desert, while we in California sometimes suffer from hot winds from the deserts to the east of us. The wild plants of the Mediterranean region are similar to ours. The same fruits thrive there as thrive in California. In both regions irrigation is necessary.

The semi-tropic region of summer sunshine and winter rains which we have been visiting is said to have a "Mediterranean climate." California is a second Mediterranean region, and we are going to see if we can find others. Wherever over the whole world we find a place with such a climate, we think of it as a delightful land of sunshine, orange groves and irrigating ditches.

Do you think it likely that the people of one Mediterranean region would have much occasion for trading with those of another, since their natural products are so much alike? At present there is no reason for our going to Spain or any other country about the Mediterranean sea for semi-tropical fruits, although there was a time when we did not grow all the raisin .

grapes or all of the lemons that we used. The people of Italy still sell us olive oil, however, because they can make it cheaper than we can.

The Mediterranean countries have some natural products which we do not. Greece grows Zante currants, which are



This great tree looks like one of our valley oaks, but it is in far away Spain. It is one of the cork oaks for which that country is so noted.

really little seedless raisins. There is no reason why these grapes should not thrive in California. Italy is noted for its chestnut forests. Everywhere in the cities of Italy are street peddlers with their stands of roasted chestnuts. We can buy Italian chestnuts at some of the fruit stands in California.

Spain has its cork oak trees, from the bark of which all our corks are made. These trees do not

grow in thick forests, but are scattered over the hillsides and valleys, in the same manner as our beautiful oaks are scattered throughout the valleys of California.

The people of some of the Mediterranean lands make beautiful and artistic goods, of many sorts, in their own peculiar way. We buy from the Italians, cameos, silver filigree work, pottery and statues.

Has California anything to sell that the people about the Mediterranean sea want? These countries are very mountainous and some of them do not raise enough wheat for their own use. We once had wheat to sell but our farmers are finding it more profitable to raise fruit, and so we have to buy a part of the wheat we need. The Eastern States sell the Mediterranean people coal, for their lands have little fuel of any kind.

The Eastern States ought to sell them farming implements, for theirs are very crude; but the farmers of the Mediterranean lands are poor and have little money with which to buy conveniences.

Let us continue our search for other lands with a Mediterranean climate. We must not forget that these lands must lie in about the latitude of California, that is they must be east or west of us, must be lowlands and must have their winds blow off some ocean or sea.

As we go east from the Mediterranean lands, we enter Asia. We travel for thousands of miles across deserts and over lofty mountains and plateaus; we cross the highest mountains in the world. The first countries that we reach that have a sea coast are China and Japan. But is the climate in any part of these countries like that of California? If we reach China during the winter, we shall find a dry, cold land wind blowing from the north. It is loaded with dust from the desert of Mongolia and reminds us of the desert winds of Southern California, only these Chinese winds are colder.

If we visit the east coast of Asia in the summer, we shall find that the winds have turned about and are blowing from the ocean, bringing with them abundant rains. These ocean winds blow steadily like the trade winds, but are called "monsoon winds." China and Japan are, then, unlike California, for they have their wet season in the summer and their dry season in the winter. From what we know of our home climate, we can safely say that those parts of China having the same latitude, must be too cold for semi-tropical fruits and that to find these we shall have to go farther south. A few oranges are grown in southern Japan, but they do not have the sweetness of ours. Passing China and Japan, we find ourselves upon the Pacific ocean, with no more land except islands between us and our starting point in California.

CHAPTER 20.

Let us now visit the lands in the Southern Hemisphere, as there may be some in that part of the world with a "Mediterranean climate." There is so little land in the Southern Hemisphere, that our journey will be largely upon the water.

We will leave San Francisco or Los Angeles and voyage southeasterly along the Mexican, Central American and South American coasts until we reach a point as far south of the equator as California is north of the equator. We leave California in the west wind belt, but soon reach the belt of light winds and calms, which we have called the "horse latitude". Reaching Central America, we get into the belt of northeast trade winds. These winds bring a great deal of rain to the countries about the Caribbean sea, but the west coast which we are passing is drier because of the high mountains of Central America. There is, however, enough to give the shore a rich and flourishing appearance.

We pass Panama and the coast of South America. The country near the isthmus is low, and the rains brought by the trade winds cross it and for hundreds of miles cover the west coast of South America with a jungle so dense and so unhealthful to white people that few have settled there.

After crossing the equator and its belt of almost daily showers, we wake up one morning in sight of an altogether different land. The high Andes mountains cut off the rain winds and the shores are as a result bare and desolate. We sail for two thousand miles along a coast with only here and there a green spot where some river flows down to the coast from the high snow covered Andes.

South of the equator there are the same wind and rain belts as north, but we meet them in just the opposite order. It is as though the earth were hinged at the equator and the part of the world lying north was turned over on that part south. The tropical belt of calms and rains lies both sides of the equator on a hinged line. If the northeast trade wind belt we have just passed through were turned over, it would form the southeast trade wind belt south of the equator. Next

towards the south would come the "horse latitude," and then the westerly wind belt for which we are looking. It is in the westerly wind belt one must remember that the Mediterranean climate is found.

We finally reach central Chile, as far south of the equator as California is north. We go ashore at Valparaiso and take a train over a low coast range for Santiago, the capital of the country. Here in the "Beautiful Valley of Chile" we are in another California, with its Mediterranean climate. All about us are orchards and vineyards of the same semi-tropic fruits that we are familiar with at home.

The belts of winds and calms move back and forth in the Southern Hemisphere, just as they do in the Northern; the only difference is that the seasons are the reverse of ours. If we leave California in the spring, when the trees are blossoming, we shall find it is fall in the valley of Chile. Grapes are ripe, the temperate fruits are being picked, but the oranges have not yet begun to color. Rains fall in the winter as they do in California, while the summers are dry. Back of the beautiful valley of Chile rise the lofty Andes mountains with their vast snow fields, which supply an abundance of water for irri-



South America supplies us with a part of the wool we weave. A part of South American wool goes to England, is there woven into cloth and then comes to the United States.

gation. If we go south through this beautiful valley, we find in the course of a few hundred miles that the climate becomes colder and wetter, just as it does when we go north from California through Oregon and Washington.

People from many different countries have settled in Chile, but most of them are Spanish who speak the Spanish language. The industries are mainly the raising of fruit, cattle and sheep. Since they produce the same things that we do and have not yet manufactured much of anything that we would like to buy, it is plain to see that we have little occasion to trade with them.

Since we have headed east on a journey around the world, in the Southern Hemisphere we must next cross the Andes mountains. There are many peaks that rise higher than the Sierra Nevada mountains, but there are passes between them. Through one of these a railroad has been built. This will finally land us in Buenos Aires, the largest city of South America.

Descending the eastern slope of the Andes we come to a desert region where irrigation is necessary. What we have already learned about the climate of California helps us to understand how the Andes break the west winds and take from them their moisture. The eastern side of the Andes, where we cross them, is then a desert, for the same reason that Nevada, lying east of the Sierra Nevada mountains, is a desert.

The railroad carries us across the plains of Argentine to the mouth of the Plata river. The rainfall gradually increases as we approach the Atlantic ocean, just as it does in our own country from the dry plains at the foot of the Rocky mountains to the forest covered Atlantic coast.

Instead of going to Buenos Aires, we will turn northward across the Plata river to the little country of Uruguay, with its delightful sub-tropical climate. Here are lemon and orange groves, but the people generally prefer raising cattle and sheep to growing fruit. This is a pleasant land, with rains both winter and summer, but its climate is not Mediterranean, although the same fruits grow there that grow in California. We can no more say that it is another California than we can say that Florida is another California because oranges and lemons thrive there. Florida has summer rains and irrigation is not necessary.

Now the South Atlantic ocean lies before us. Let us follow the parallel of 35 degrees south latitude, which is about

the same as that of Southern California in north latitude. The first land we reach is the extreme southern tip of Africa. We land at Cape Town and remain a year, to find out if it has such a climate as we are hunting for.

We discover at once that oranges and other semi-tropical fruits with which we are familiar grow there in abundance. We find ourselves among English speaking people and feel quite at home. The climate turns out to be much like that of California, for as winter approaches the rains begin and last until spring. The summer is dry and sunny and irrigation is needed.

In the Mediterranean region of South Africa, as well as in the others we have visited, we miss the ocean fogs which make the summers cool in all the coast valleys of California. Most of us agree in wishing that our home land did not have these fogs, but the farmers say they could not get along without them. The ocean water is colder off the California coast than it is off the other Mediterranean regions we have visited, and that is the reason we have the fogs.



Thatching house roof with palm leaf mats in Southern Nigeria.

Africa reaches just far enough south so that the westerly wind belt reaches it in winter, while in summer it does not touch Africa at all, and the dry "horse latitude" belt gives the region its Mediterranean climate. It is not interesting to know that the two opposite ends of Africa have the same climate, while the hot, wet jungles along the equator occupy the middle part.

Let us now leave South Africa and voyage on eastward across the Indian ocean. If we use a sailing vessel, it will be better for us to make the journey in the winter season, because then the westerly winds will be behind us and help us on. In the summer we would have a much longer and more tiresome voyage because of the variable light winds and calms.

We come in sight of no land at all until we reach the southern shores of Australia. Landing at various places, we again see orange orchards and irrigating ditches—sure signs that we are in a Mediterranean climate. There are not many orchards, for Australia, like South Africa, is far from parts of the world that offer good markets and the people find it more profitable to grow other things.

We have now made the circuit of the world twice and found all the lands with a climate and productions like those of California.

Our two journeys around the world in the westerly wind belts have shown us four regions besides that about the Mediterranean sea in which the orange thrives and in which the lack of summer rains makes irrigation necessary. These are healthful, pleasant lands, but their inhabitants very naturally do not trade much with each other in products of the soil.

CHAPTER 21.

WE HAVE LEARNED SOMETHING OF THE WONDERFUL VARIETY OF OUR CALIFORNIA PRODUCTS, A VARIETY SO GREAT THAT WE COULD GET ALONG, IF NECESSARY, WITHOUT THE REST OF THE WORLD. BUT WHEN WE MAKE A LIST OF THE FOOD, MEDICINES, CLOTHING MATERIALS, ART GOODS, TOYS, FIBERS, PRECIOUS STONES AND MINERALS, ONE OR MORE OF WHICH ARTICLES SHIPS BRING US FROM ALMOST EVERY CORNER OF THE WORLD, WE REALIZE HOW MUCH WE DEPEND UPON OTHER PEOPLE. THE THINGS WE GET FROM THEM ADD TO OUR HEALTH, HAPPINESS AND USEFULNESS. BESIDES IN BUYING THESE THINGS WE HELP MAKE A MARKET FOR OUR OWN GOODS.

1. THE FOOD PRODUCTS THAT WE GET FROM FOREIGN LANDS.

WHY IS IT THAT MOST OF THE FOODS AND FOOD PRODUCTS SENT TO CALIFORNIA COME FROM TROPICAL OR EQUATORIAL LANDS?

The people of California have no need to send to other lands for temperate grains, fruits and vegetables. What we buy must come either from the arctic regions or from the tropics. We cannot expect the people of the North to have anything to sell to us in the food line unless it be fish. The food plants of the North are few and are, besides this, very much like those of the colder parts of our own country.

We get great quantities of canned salmon from Alaska. The great fishing banks of the world are all in cold northern waters.

Of course very few of the fruits, grains, vegetables and nuts of the temperate belt were found growing naturally in any one place. In trading with each other for thousands of years, plants of one region have been carried to another. The Indians found living in California when the white people first came, did not carry on agriculture, and all our important food plants have been brought from other lands. The United States Government has agents all over the world, where the climate

is temperate or sub-tropical, looking for new fruits and berries that might be worth growing here.

Tropical plants, with a few exceptions, will not grow and bear fruit in California, partly because of the dry air and partly because of the winter frosts. We must conclude then that most of the fruits and vegetable products shipped here from foreign lands come from the torrid or tropical belt where it rains a great deal and the air is very moist and where the sun is directly overhead during some portion of the year. It is not as hot in the tropics as it is in either Death Valley or Imperial Valley, but the heat and moisture together make the climate far less bearable for white people and produce a different sort of vegetation.



This is a street scene in the city of Singapore in southeastern Asia.
Note the "rickshaw" and the coolie with his
baskets of pineapples.

CHAPTER 22.

In order to learn of the tropical products that we buy, we will now visit southeastern Asia and the East India Islands, stopping first at Singapore, a city at the southern end of the Malay Peninsula and almost on the equator. A bright morning induces us to take a ride in a jinrikisha to the interesting tropical gardens. Before we are out long, clouds gather overhead, followed by repeated heavy showers and spells of sunshine. The Chinese coolies pulling the two wheeled carts in which we are riding wear only a bit of cloth around the hips and do not mind the rain, for the air is so warm. The air is also damp, to such a degree that clothing packed in our trunks for a short time becomes covered with mold. Though sitting still, we are always sweaty. The nights are almost as warm as the days.

How the native plants thrive in the warm, moist air! The endless variety of palms, the great bamboos, the tree ferns, the many strange trees with their tropical fruits, the vines and small plants, the strange dress and strange homes of the Malays, all together make up a world very different from that of California.

We will now take a boat for the Island of Java, crossing the equator through quiet coral seas to Batavia, the capital of the island. One of the most interesting sights in Batavia is the native market, where are exposed for sale more strange fruits than we ever dreamed the tropics produced. There are among them some such as the coconut, the pineapple, the banana, orange, grape fruit and limes, with which we are familiar. Among the strange ones are the bread fruit, mango, mangosteen, marmaduke and rambutan. The durian is the largest fruit; it has a delicious taste but a very disagreeable smell. In one part of the market are grains, including millet, rice and sesamum. There are stacks of vanilla beans and such food products as sago and tapioca. There are stalls where the Island tobacco is for sale, also sugar cane, cotton, sugar, tea, coffee and indigo. In another part we are surprised to see corn, rye and the common vegetables of the

temperate belt. How can we explain the presence in this market of not only tropical products but also those of the semi-tropics and temperate belts?

The Island of Java is about the size of California, but supports about ten times as many people. It is one of the richest tropical regions of the world and contains a wonderful variety of plants. It is so mountainous, and in places there are such vast, dense jungles in which, on account of fevers, not even the natives can live, that only forty acres out of every hundred can be cultivated.

Although Java lies almost on the equator, we find in the market not only productions of the hot lands, but also those of the semi-tropics, such as the orange, lime and grape fruit, and even some from temperate climates, such as corn and potatoes. What is the explanation of this strange mixture, since we have learned that most fruits, grains and vegetables thrive only in the climate to which they are accustomed? The answer is found in the fact that the Island is very mountainous; it is one of the most remarkable volcanic regions in the world; some of the peaks rise as high as 12,000 feet.

Just as in the case of California, many of the most val-



Here is a group of the tropical fruits found in the markets of any of the tropical cities of southeastern Asia.

uable plants are not native, but have been brought to the Island by the Dutch, who have made of it the richest garden spot in the world. The volcanic soil is very productive. Rains fall throughout the whole year and the air is always warm and moist. We must remember that near the equator there is little difference between winter and summer and that plants do not stop growing for a part of the year, as in California. As we look at Java from the sea, or out over the surface from a car window, as the train climbs to the highlands, it is hard to believe that so many people live upon the island, for it appears to be one vast forest of coconut palms.

The villages of the natives are so hidden by the palms that we are not aware of their existence until we are right in them. The bamboo and the palm supply all the materials for their homes. They do not make much use of the hardwoods that grow in the forests of the interior and which we consider so valuable.

Many of the tropical fruits are, of course, found naturally in Java, but most of the tropical products that are important in its commerce have been introduced from other tropical lands. Among the latter are the cinchona tree, coffee tree, the tea plant, the banana tree and tobacco plant. The temperate fruits, grains and vegetables have all been brought from other regions.

The greatest variety of products come from the hot, moist lowlands bordering the coast. Upon these are found the rubber and sugar plantations; a part of the tobacco, cotton, rice, millet and sesamum fields. Here grow the spice trees, including the nutmeg, cinnamon, mace and pepper. These were the most eagerly sought products of the Indies long before Columbus discovered the New World. In order to be marketed in Europe, they had to be carried by sea to India. Then began the long caravan journey across southwestern Asia to the shores of the Mediterranean sea. From this point boats carried the spices to Venice, Genoa or Barcelona for distribution over Europe.

The coconut palms grow chiefly upon the lowlands. Back of these palms come the sago palms, which, in addition to the starch-like product known as sago, also produces sugar.

Back of the coast lowlands we come to slopes where the air is a little drier and cooler. Here the native productions

are quite different. Here are groves of cinchona trees, tea and coffee plantations, and the sugar palm. Tobacco and sesamum are also grown here. The most interesting sight in this belt is the rice fields. Each field of rice, whether big or small, is surrounded by a low bank of earth to hold the water necessary to flood the field. The natives wade in the mud and water when they transplant the little rice plants from a nearby nursery patch. The fields are kept flooded until the grain is nearly ready to harvest, and then the water is drawn off. The rice fields are built upon the slopes of the hills and mountains by terracing them. Each field forms a broad, flat step in the stairway. Where the slope is gentle, each patch of rice is large. Where the slope is steep, the patch must be small because each one must be small and surrounded by a bank of earth to hold the water.

It is interesting to watch the brightly dressed Javanese men, women and children as they cut the rice and tie it into little bundles to be taken home and threshed. Where the fields are large, the water buffalo is used to plow and prepare the land for the rice. During the heat of the day, these interest-



Malays always build their houses near or over the water because their chief occupations have to do with the sea. Note the coconut palms overhanging the water.

ing animals can be seen in the streams or ponds, with only their heads sticking out.

Higher still upon the mountain slopes we come to a temperate climate, but there is little to remind us of our home region, for with the exception of a few imported plants everything is different. There is scarcely any difference between winter and summer. Among the strange plants we see some that are familiar and tell us that, although we are almost on the equator, the climate is that of the temperate belt. There are oaks, chestnuts and laurels, and the natives that live there raise corn, tobacco, rye and the common vegetables of our country and Europe. They take these products in baskets down to the coast cities to sell.

The Malays, who form the greater part of the inhabitants of Java, are more civilized than are the natives of the other East India Islands, for long ago Hindu immigrants settled there and brought the religion of Buddha. Later the Dutch gained control of Java and encouraged the natives to live better and to stop fighting among themselves. There is no more interesting sight anywhere than that of a fair or market. Huge covered carts come in, driven by water buffaloes, filled with all sort of produce. There are curious implements of every sort used by the natives—strange musical instruments and an endless variety of stamped cotton cloth called batik. This is worn by the women as a sort of shawl, and by both men and women as a short skirt. The men carry a short sword or dagger, called a kris.

WHY IS IT ALTHOUGH JAVA IS SUCH A RICH TROPICAL LAND THAT WE CALIFORNIANS HAVE SO LITTLE TRADE WITH THE COUNTRY?

The greater part of the trade of Java is naturally with Holland, the mother country. The most of the ships that carry away the products are Holland ships.

Java is, besides this, very far away and the most of her tropical products we can buy nearer home. Among these are rubber, tea, coffee, coconuts, copra, hardwoods, pineapples, cane sugar, cinchona, cacao, etc.

Java is the most important of the East India islands. To discover a route by which the spices of this region could reach Europe easier than overland across southern Asia was one of

the objects of Columbus when he undertook the voyage that led to the discovery of America.

Spices are used in all of our homes and we still get the most of them from the East Indies. We get sago and tapioca from Java, where the growth and preparation of these foods is an important industry.



Pineapple field near Honolulu.

ALTHOUGH THERE IS A WONDERFUL VARIETY OF TROPICAL FRUITS IN THE LANDS ALONG THE EQUATOR, WE FIND ONLY TWO KINDS EXCEPTING THE COCONUT IN OUR OWN MARKETS. WHAT IS THE REASON FOR THIS?

It has been found impossible to carry most tropical fruits to the markets of temperate lands, because they spoil so quickly. The mango is one of the best, but it has rarely been seen on our tables. One variety of the mango is now being grown in protected places in southern California; so we may be able to enjoy them without going to the tropics.

We all know the Hawaiian pineapple, both fresh and canned. Singapore pineapples also sometimes reach our tables. This fruit is not only delicious, but also very healthful.

The first pineapples that civilized people ate were found growing in the tropical parts of America; but the plant has now been transplanted to all tropical lands. As it does not stand frost, we shall never be able to grow this fruit in California; but it does thrive in the extreme southern part of Florida.

The most important pineapple plantations are in the Hawaiian Islands. It is only about one-third of the distance to these islands that it is to Singapore and Java, so we naturally do not buy much from the latter countries.



Bird peddlers in a Mexican city. Note the peculiar costumes.

We have never learned definitely where the native home of the banana is, but it is now grown in all tropical countries. In some countries the natives almost live upon bananas, but the fruit is mostly starch and is not very nourishing. There are many different kinds of bananas, some of which are called plantain. In southeast China there is a variety that is so large that a single one forms a meal for three men.

We get the most of our bananas from the Hawaiian Islands, though the coastal lowlands of Mexico and Central America supply us in part. In the latter country, the home of the banana is damp and very hot, so the native Indians and negroes do most of the work of gathering and loading the bunches of fruit. We would be surprised if we could see the many ships engaged in carrying bananas from the shores of the Caribbean sea to New York and other large eastern markets.

Banana growing is about the most unhealthful industry you could engage in if you decided to make your home in the tropics, for it thrives best where the climate is the worst for white people. The lowlands where it thrives best have the further advantage of being near where steamers can take the fruit. Bananas will grow as high on the mountains of the tropics as is possible, without suffering from frost.

One sort of banana palm, as we shall learn later, supplies a fiber (Manila hemp), valuable for cordage.

Many banana plants are to be seen throughout southern California, especially near the coast, where there is the least danger of frost. Those in exposed places freeze down every winter. None of our plants produce any fruit.

WE FIND THE PRODUCTS OF THE PALM TREE VERY USEFUL FOR MANY DIFFERENT PURPOSES, BUT THEY ARE NOT NECESSARY TO OUR COMFORT AND HAPPINESS. HOW IS IT THAT THIS TREE IS SO NECESSARY TO THE PEOPLES OF THE TROPICAL AND SUB-TROPICAL BELTS THAT MILLIONS OF THEM COULD NOT HAVE MADE THEIR HOMES WHERE THEY ARE IF IT WERE NOT FOR THE PALMS?

The palms are not strangers to us here in California, for we see them growing everywhere in the valleys as a street and ornamental tree. There are many kinds that will thrive in California, and one specie is a native of the desert canyons at the eastern base of the San Jacinto mountains. The



Coconut rafts, Papsanjan, Philippines.

region in which these palms grow has recently been made into a National Park. The most beautiful palm of all is the "queen palm", which thrives in the warmer parts of southern California.

From what we know of the palms, we can imagine how beautiful must be a landscape where palms of every description form the chief trees. There are over one thousand varieties of palms. No other group of trees in all the world is so useful to so many people, especially the people of the tropics.

We can imagine how the oases in the desert, with their springs of water and their date palms, gladden the heart of the Beduoin Arab of the Sahara; or how new life is put into the voyager in the South Seas when the coconut palms, rising above an otherwise barren coral island, come in sight.

Different palms prefer different places in which to live. The date palm and our native palm love the dry, hot air, but they must have their roots in water. The palms of the Amazon forest love the moist, hot air, so difficult for white people to endure.

It seems as though Nature had purposely made the coconut palm with a fruit of such sort that it could spread through all the islands of the South Pacific ocean and thus form a source of food supply and, in many cases, the only source for the native explorers from southeastern Asia, when they ventured out, or were blown out by storms into the unknown regions of the ocean. When supplied with coconuts and fish from the sea, the inhabitants of the South Sea Islands manage to get along very comfortably. Coconut palms love the hot, moist lowlands that border the ocean; in fact, they do not object to having their roots in salt water, although they do not grow in the water as the mangrove does. So closely do the coconut palms crowd the ocean, that frequently their nuts fall into the water. About the hard nut, with its precious contents is a thick husk which the water cannot penetrate. Thus the coconut floats away, perhaps to lodge safely some weeks or months later upon some distant shore. This may be a coral reef just rising above the ocean. Here it sprouts, though washed over by the salt water, and finally grows to a tree. As the island increases in size other palms spring up and finally there is a little grove bearing fruit enough to support any party of islanders that happens along and decides to make a home there.

Can you think of all the uses we can make of the coconut here in California? Our uses are, however, few in comparison with the uses to which the South Sea Islanders put every part of the nut and tree. We should have to visit these people in their homes to realize how valuable to them is the coconut palm. The property or wealth of a native islander is reckoned by the number of coconut trees he owns. The roots, the stems, the young, tender shoots, the leaves, the husk, the shell, and finally the meat and milk within the nut, are all made use of.

The coconut palms form vast forests along the coasts of India and the larger of the East India islands. As we go inland, as was seen in the Island of Java, the coconut is replaced by other trees. Upon thousands of the smaller coral islands the coconut is almost the only tree. The gathering and exporting of copra, dried coconut meat, is the chief industry of many of the islands of the South Pacific. Little sailing vessels go among the small islands, trading with the natives for copra. They bring this to some central port where large steamers take it to the United States or Europe.

How different are the surroundings of the home of the date palm. It is just as necessary to the dwellers in the deserts of Arabia and Sahara as the coconut is to the South Sea Islanders. It has been possible for large villages to grow up in the heart of the Sahara solely because of the date palm. If the springs forming an oasis are small, the spot may be only a stopping place for caravans. If there is an abundance of water, the date palms may number many thousands. Of course, the palm is not the only vegetation in the larger oases. There are grains of different kinds, as well as vegetables. Dates are especially valuable to the desert traveler, for they will keep indefinitely. They are very nourishing and can be easily carried. The stems, branches and leaves are also used for various purposes.

In Java and the other East India Islands there is a variety of date palm, the sap of which, when it is boiled down, produces sugar. When allowed to stand and ferment, the sap makes an intoxicating drink called arrack.

The date palm has been found to flourish and ripen delicious fruit in the hotter parts of California. Coachella and Imperial valleys have many orchards of date palms, the sprouts

from which the trees have grown having been brought from the oases in the Sahara desert. If Coachella valley had also the dark skinned Arabs and camel caravans, it would be easy for the children there to imagine themselves in Africa.



Gathering dates in a desert oasis in North Africa.

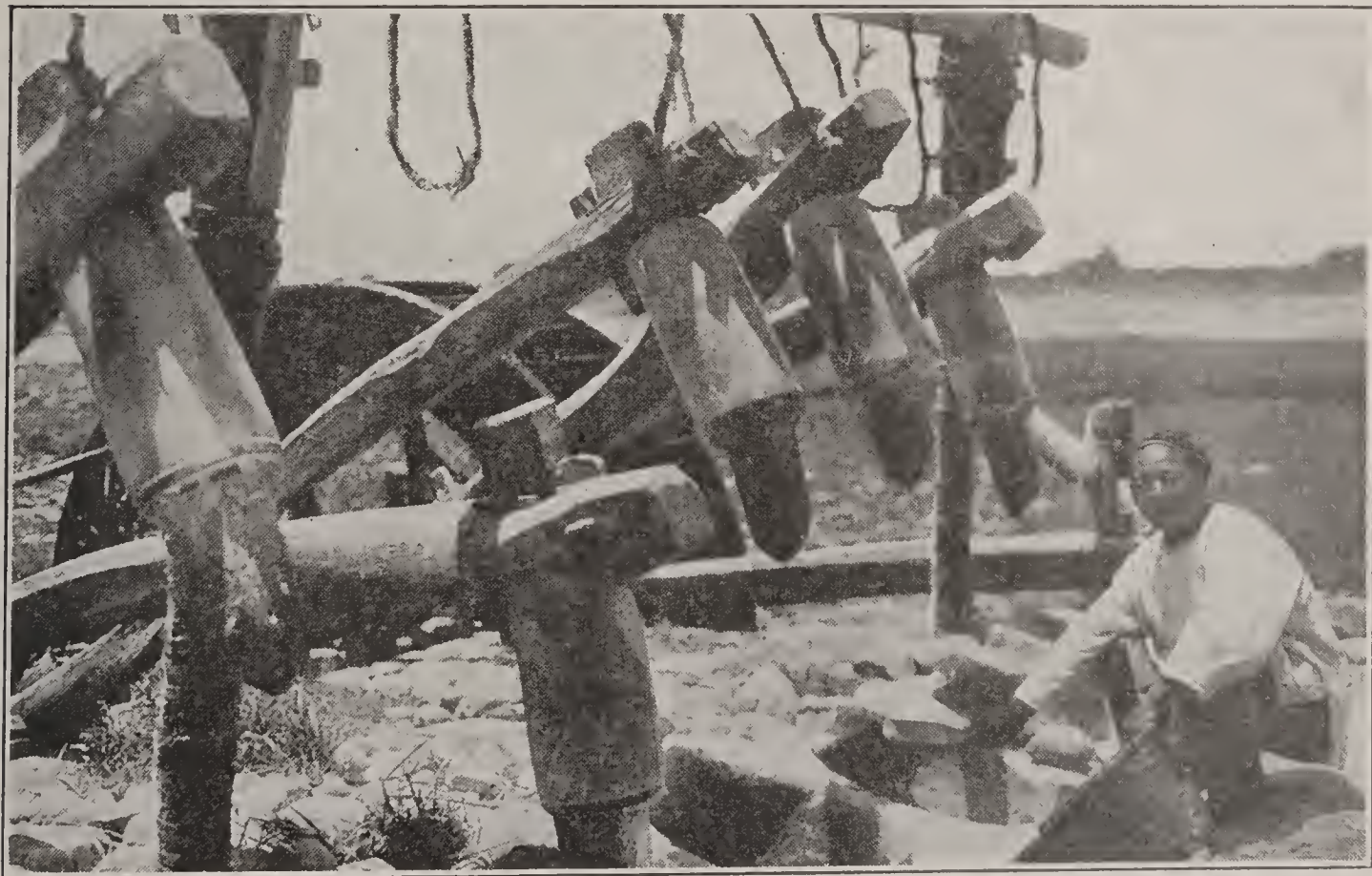
CHAPTER 23.

HOW HAS IT COME ABOUT THAT WE DEPEND LESS UPON TROPICAL LANDS FOR OUR RICE AND SUGAR THAN WE DID ONCE?

Once the rice we ate, with the exception of some grown in the Southern States, came from China and Japan. Now, as everyone knows, we grow in the Sacramento valley all the rice we want and can sell to others.

We depend less upon sugar made from sugar cane than we did once, because we now manufacture so much sugar from beets. You have doubtless heard your mother say that cane sugar was better for some purposes. Because of a difference in the two kinds of sugar, we shall depend more or less upon the sugar plantations of the Hawaiian Islands and those of Cuba for our sugar.

Rice is a food upon which more people depend than upon the coconut, for it grows equally well upon the hot lowlands of the equator or upon the mountains of the hot belt, up to a



Hulling rice by means of pestles lifted by water power.

height of 6000 feet. It thrives in the warm, temperate belt in which California lies, because there is an abundance of water and a hot summer long enough for the rice to mature, without danger of frost.

The map of the world's rice farmers is a very interesting one. Rice is a tropical plant and we ought to find the lowlands of this belt inhabited by rice farmers around the whole world. But, strange to say, there is no rice grown in tropical Africa, and but little in South America, while the largest rice fields of Europe are in the Valley of the Po river, in northern Italy.

The lands where people depend largely upon rice are mostly in southeastern Asia and the East Indies, including China, Japan, Philippine Islands and India.

The vast lowlands of the Amazon river and the Kongo river, with their hot, moist climate, are inhabited largely by savages who do little farming of any kind, depending upon hunting and fishing and what grows wild in the jungles. The rice eating people of Asia are more or less civilized. Some of them, such as the Chinese, recently thought they were more civilized than we are. The Island of Java, inhabited by a partly civilized farming people, raises a great deal of rice, while the natives of Sumatra and Borneo, lying near by, produce almost no rice, as the most of them are savage.

In lands where wheat or millet is the main crop, the farmers sometimes suffer from famine because of the failure of the crop, but the crop of the rice farmer never fails, because rice is grown only where there is an abundance of water to flood the fields.

If we traveled around the world, following a line near 30 degrees north latitude, we would have to the north of us all the beet sugar growers, while to the south would be all the growers of sugar cane. We would discover another very interesting thing, and that is that the people of the two very large islands, Cuba and Java, grow about half the sugar cane of the whole world. The country that grows the most is India. Our cane sugar comes from the Hawaiian Islands, for we are their nearest market.

Wherever sugar cane grows, we may be certain that the climate is warm and wet and the soil very rich. Sugar cane loves the rich delta lands, as we see in the United States, in

Egypt and in India. Find out what these deltas are from the map.

The people of the hot lands who raise sugar cane do not eat a great deal of sugar; they sell the most of it to people of temperate lands, who often, as in our country, eat more than is good for them. How the children as well as grown people love sugar, we can see in the markets of tropical countries where sugar cane is raised. The cane is cut up into short pieces and is sold in the markets as we sell candy. It is interesting to see little children going around sucking pieces of sugar cane.

TEA, COFFEE AND CACAO, THREE PRODUCTS OF HOT, MOIST LANDS, OF WHICH WE USE A GREAT DEAL, THOUGH ONLY THE LAST MENTIONED HAS ANY REAL FOOD VALUE. ARE THE PEOPLE WHO RAISE THESE PRODUCTS AS FOND OF THEM AS WE ARE?

When *tea* is mentioned, do we not think of the Chinese and their beautiful porcelain cups, out of which they are always drinking tea? When *coffee* is mentioned, do we not think of the Turk, who, sitting cross-legged on a rug, loves to treat his guests to a cup of black coffee? When *cacao* is mentioned, we think of the meaning of the group of trees to



Hauling sugar cane to mill in Mexico.

which the cacao tree belongs. This is a Greek word meaning "food for the Gods", because of the delicious and nourishing substance, cacao, which they supply us.

Why do the natives of China, where the tea plant originated, think so much of this beverage, which has really no food value, and why, as soon as the English tasted it, did they organize the line of sailing vessels called the "China Clipper Service" to bring fresh tea as quickly as possible to England? We are sure that one of the reasons for drinking tea is that it is pleasant and stimulating. If you would travel in China I am sure that you would agree that another reason for tea being used by everybody in that great land is that the water in almost every part is unfit to drink without being boiled.

The most thickly settled part of China is a vast lowland across which the rivers flow slowly. Between the rivers, the country is cut up by thousands of canals, in which the current is still less. The waters in these canals becomes very dirty and totally unfit for drinking without boiling. The addition of a few tea leaves to a cup of boiling water make a pleasant, stimulating drink which entirely takes the place of water.

If we look at the map of Asia, we shall find that three countries, China, Japan and India, including the Island of



Checking up the tea pick in Japan.

Ceylon, produce most of the tea, while the three countries that buy the most are England, the United States and Russia. We, of course, get our tea by water, but Russia gets the most of her tea by slow camel caravans across the deserts of Central Asia.

Tea is light but bulky, and in order that the camels may be able to carry a real load, the leaves are compressed into little bricks by a machine made especially for the purpose. These bricks are heavy and almost as hard as stone. When a Russian wishes to make a cup of tea, he takes a hammer and breaks off a piece from one of the bricks and puts it in the samovar, which is always kept boiling.

The tea plant is not very particular where it grows, for it is found in Japan in a warm, temperate latitude, and in Java and Ceylon almost under the equator. It also grows on the lowlands and upon the slopes of the Himalaya mountains, up to a height of 6000 feet.

The tea plant is, however, very particular about some matters; it must have a damp climate and cannot stand any frost. This makes it impossible for us to ever grow tea successfully in California. Another reason why we could never make money growing tea, even if the climate permitted us to



It rains so much in Ceylon that the native carts are covered with huge hoods to keep the loads dry.

do so, is that in the countries of southeastern Asia the people work for very little. The women and children, as well as the men, take their baskets into the tea plantations and gather the leaves by hand.

When we turn our thoughts to Turkey and the Turk, in his baggy trousers, red fez and slippers, sitting cross-legged sipping coffee, we are near the first known home of the coffee plant or tree. The Turk gets his coffee from Mocha, or thereabouts, in southern Arabia. The Arabians got their plants in the first place from Abyssiania, a country in Africa, across the Red sea. Here at a height of 6000 feet the coffee plant was first grown.

When the Europeans discovered the coffee of Arabia, with its fine flavor and its stimulating properties, they hastened to get plants to take with them to their possessions in tropical America and the East Indies in order that they might have all they wanted.

The coffee plant was found to grow upon all well drained lands, up to a height of more than a mile, but never above the frost line. The coffee plant is not as particular as the tea plant about having a moist air, and is satisfied in a very dry climate, like that of Arabia, if it can be well irrigated.

Highlands with a rich soil, free from frost and with an



Coffee pickers at Sao Paulo, Brazil,

abundance of rain, lie just back of the steep coast mountains of southern Brazil. Coffee plants were set out here and found to thrive so well that now this region produces three-fourths of all the coffee of the world.

If there is a city in the whole world that is noted for a particular thing, it is Santos, the seaport for the Brazilian coffee plantations. As you land from the steamer and enter the city, you see and smell coffee on every hand. The drays on the streets are carrying bags of coffee; the cars at the station are loaded with it. At the docks you will see at any time, day or night, the stevedores carrying bags of coffee up the gang planks of the steamers.

To reach the coffee plantations, we climb by means of a finely built railroad up the steep coast slope of the highlands, densely covered with a rich tropical vegetation. Reaching the top of the plateau-like upland, which is between 2000 and 3000 feet above the sea, we find ourselves in a cooler and drier climate. Because of the less rainfall of the plateau the vegetation is not very heavy. This makes possible the clearing of large areas at a moderate cost, in order to give room for the coffee trees. If this highland had the dense vegetation of the Amazon valley, even though its soil and climate were in



Mexicans working in the fields of the great valley at the foot of Mt. Popocatepetl.

every way favorable, the plateau would never have become the rich and flourishing district that it is.

In Java, China or the Philippines, each family has its plot of rice, which it tends, selling the spare product. The rice crop is a certain one and the family depends upon it for its main food supply. There are many risks to be taken in the growing of coffee, and some years the crop is so light that people of small means cannot carry on the industry. Because of this, coffee is grown upon great plantations covering thousands of acres, each plantation being owned by a wealthy man or by a company.

Coffee growing regions are healthful ones in which to live. Coffee thrives best in the warm belt between the hot, wet belt of sugar cane, rubber and bananas, and the orange or semi-tropical belt.

Cacao, the "food of the Gods", interests us, or ought to at least, more than tea or coffee, for it is a nourishing food as well as a drink. It can also be enjoyed by children, for it is not harmful to them as is tea or coffee.

If we want to find the natural home of the cacao tree, we must go to the lowlands of the tropics in Central and South America. The wild cacao forests are especially important upon the coastal lowlands of Ecuador and upon the headwaters of the Amazon river, on the opposite side of the Andes mountains.

Cacao was known to the Aztec Indians of Mexico at the time Cortez conquered the country. Montezuma, the Emperor, is said to have been very fond of cacao, drinking large quantities daily, as did his household.

While there are great numbers of cacao trees in the more inaccessible of the tropical forests of South America, yet the most of the cacao beans shipped out of South America now come from plantations. The trees are cared for much in the same manner as those of coffee and rubber plantations. Negroes and Indians do the most of the work and live almost like slaves.

The cacao beans are shipped in bags to Europe and the United States, where the various preparations of chocolate and cocoa are made from them. The oil of the nut is made into cocoa butter.

ARE NOT THE MEDICINAL SUBSTANCES WHICH WE GET FROM OTHER LANDS OF MORE REAL VALUE THAN THE FOODS ABOUT WHICH WE HAVE BEEN STUDYING?

Our trade with foreign lands in substances which are valuable in medicine is a very important one, and were it stopped, we would suffer more than if foreign food supplies were cut off.

Opium is obtained from the poppy plant, which is produced mostly in India and China, although it will grow in southern Europe and the southern United States. The doctor could hardly get along without the various preparations of opium, but when this drug is used to excess it is very harmful. Opium smoking has become a habit among the Chinese and other people of southeastern Asia. It is against the law to have opium in one's possession. The substance is so valuable, however, that men take all kinds of chances in trying to smuggle it past the Customs' officers.

The fertile plains of India and China are so dreadfully crowded with people that it is all they can do in favorable years to raise enough food to eat. The growing of the poppy, while it brings them money, uses land that should be given to producing food. The Chinese government is making a great effort to shut opium out of the country and to stop the growing of the poppy.

Quinine has become so important in our lives that we could not do without it. Before it was known that malaria, or "chills and fever", as the disease was called by early settlers, was caused by the bite of a mosquito, the only thing which made the lives of the early settlers upon marshy river bottoms bearable, was quinine. Quinine is the best friend of the white traveler in tropical jungles, for by taking large quantities he is usually able to escape the fevers, which without it would be likely to kill him.

The cinchona tree is found in the forests of South America, from Bolivia northward. Unlike some of the other tropical trees which we have been studying, the cinchona will grow in a great range of climate. It is found between 3000 and 8000 feet elevation on the Andes mountains; that is, its vertical range is about a mile.

The cinchona, which is a beautiful tree, grows to a large size, but it is so hidden away in the tropical forests that it is

difficult to find. It is necessary to employ the Indians to find the trees and to strip the bark. So valuable is the bark that those in search of the trees have had to go farther and farther into the forest jungles until there arose a fear of the supply of quinine giving out. The effort was then made to cultivate the tree on plantations. This has been successful, and the young trees carried to other tropical regions are thriving. Great numbers of trees are now growing in India and Java. The Spaniards of the South American countries, of which the tree is a native, have been too indolent to encourage this valuable industry as they ought to.

The wonderful virtues of the bark of the cinchona tree were known to the Inca Indians of the Andes, and the early Spanish explorers learned about it from them.

We must not confuse *cocaine* with cacao or "cocoa", as it is called upon the cans in which we buy it. Cocaine is a preparation used in medicine and is made from the leaves of the coca plant. This also is a native of the tropical regions of the Andes mountains.

When the Indians of the Andes engage in a difficult piece of work, or go upon long journeys, they eat very little but take with them leaves of the coca plant, which they chew continuously. These leaves were used by the Indians long before the Spaniards came, and are still used. The effect of chewing the leaves is almost magical, for it enables them to keep up their strength without eating. There are parts of this region where food is difficult to get, and chewing the leaves tides over the lack until they can again find something to eat. Coca helps the Indians in somewhat the same way as opium does the Turk, the betelnut does the Malays of the East Indies, and tobacco the American.

Another product of the hot lands of southeastern Asia is camphor, which is used not only in medicines but in many industries, as, for example, in making celluloid and explosives. The wood of the camphor tree makes very handsome cabinet work and resembles cedar. It is especially useful in making chests in which articles which we wish to keep from moths are to be stored.

Camphor was formerly obtained by chopping down the trees and cutting the wood into fine chips, and then heating it, which drove out the camphor. Now the trees are saved and the leaves and small branches used.

The camphor tree, with its glossy leaves, is very beautiful and grows to a great height. It is found in the wet forests along the borders of the tropics and in the warmer parts of the temperate belt. The most extensive camphor wood forests are upon the Island of Formosa, lying to the east of China.

A visit to the market places in Burma, where the skilled workmen are making camphor wood chests, is very interesting. Here the oddly dressed men are making by hand all the delicate and careful fittings, which in our country are usually made by machinery. The chests are mounted with brass fittings like the cedar chests which appear in our shop windows before Christmas.

CHAPTER 24.

TO WHAT EXTENT ARE WE DEPENDENT UPON THE PEOPLE OF OTHER LANDS FOR THE MATERIALS OF OUR CLOTHING? WE GROW COTTON; WE PRODUCE WOOL; WE RAISE CATTLE AND MAKE LEATHER, AND THERE ARE FUR-BEARING ANIMALS IN OUR NORTHERN WOODS. WE MIGHT RAISE SILK WORMS AND MAKE SILK, AND WE MIGHT GROW FLAX AND MAKE LINEN, IF WE WISHED TO DO SO.

We could produce in California all the materials for the clothing we wear, but it does not pay us to do so. We can make the most of our California home if we give our attention to producing those things that we can either raise or manufacture cheaper and better than other people can. If people in some parts of the world have the skill and taste to weave more beautiful rugs than we do, would we not be wise to buy our rugs from them and devote our time to doing those things that we excel in?

Each region of the world has its own climate and soil in which certain plants thrive better than anywhere else. Plants from other climates may grow there if carefully nursed; still others will not grow at all. We have brought the banana plant from the tropics into southern California. It will grow but will not bear fruit. The pineapple we cannot grow at all.

There is still another reason why it is not best for us to try to do everything in California. In many parts of the world people will work for from twenty-five to fifty cents a day. We cannot hire people for much less than three or four dollars a day. We help ourselves and these people also by exchanging goods with them.

If people in different parts of the world get into the habit of buying from each other, better and faster ships are built. They become acquainted with each other and are less likely to quarrel.

Let us begin our talk about clothing materials with *Wool*. California raises a great many sheep, but not enough to supply us with all the wool we need. This is because it is more

profitable to use the greater part of the land on which sheep might be pastured for other purposes. Because of the climate, because of railroad transportation and markets, we can make more money and our State will support more people if we use the land for growing fruit than if we let it lie idle and merely pasture it. There are not as many sheep and cattle raised on the open ranges as there were once, because the land is being supplied with water for irrigation and is being cut up into little farms, each of which will support a small family, if properly tilled.

The railroads make it possible for our Western farmers and fruit growers to send their products to market, but there are just as rich lands in other parts of the world which are used only as pasture lands, because either the climate is too dry or there is lack of water for irrigation, or it is too cold, or it is too far from market to make those lands valuable for any other purpose. Sheep will browse and keep in good condition where there is not enough grass and water for cattle. They will also thrive in a colder climate. In those regions where there is no market for meat products, more money can be made by raising sheep merely for their wool than in raising cattle for their hides. We do not have to kill the sheep to get the wool, while we do the cattle to get their hides.

In what parts of the world shall we look for the great grass lands that are better suited for raising sheep than for either cattle or farming? In North America both sheep and cattle are raised in the same region, because of railroads for transportation to market. Our study of the United States has shown us differences in rainfall that make prairies of certain regions and produce forests in others. The tundras of the far north, with their stunted bushes and mosses, do not result from lack of rain but from the extreme cold.



A train of wagons loaded with wood in New South Wales.

What can we say about sheep raising in Europe? The most of Europe has abundant rains and must have great areas of good sheep pasture, but the people are so closely crowded that it requires all the land that can be cultivated to grow food for them. After looking at the map of Europe and seeing how mountainous it is, we come to the conclusion that after all there is a great deal of land that is too cold and rocky for cultivation and that the best use of this land is for pasture.

Sheep are pastured on all the high mountains of southern Europe. In places there are cattle, but sheep are more easily kept. Many sheep are raised in the British Isles, because most of the surface is rather too wet for farming. Many sheep are raised in Spain because it is too dry for farming. Many sheep are raised in the mountains of the Balkan peninsula because it is cold and barren and the inhabitants want all the wool they can get for their own clothing.

But taking into account all the sheep that are raised in Europe, there are so many people there who need their wool that there is none for export. Europe and North America do not, then, produce enough wool for their own people and must look to other continents for what they lack.

Where shall we look for the lands that are thinly peopled; that are far from markets and that contain extensive grass lands? In order to find the answer to this question, we must bear in mind what we have already learned about mountain ranges cutting off damp ocean winds, leaving the country behind them dry. Mention examples of this from California. We must also bear in mind that plateaus between mountain ranges are not only dry, but also so cold that little will grow upon them besides bushes and grass. Give examples from the Western United States. Regions that are so far north or so far south that they are too cold for profitable farming may be used for grazing sheep. And one more thing, and that is that a belt of dry and often desert land extends around the earth upon each side of the equator between the westerly wind belt and the trade wind belt. These belts where not too dry support grasses favorable to pasturage. Examples of such belts are California and the region about the Mediterranean sea.

The vast interior plain of Argentine, in South America, receives little rain because the westerly storm winds are cut off by the high Andes mountains. This makes much of the

country too dry for farming, but there is sufficient moisture to support a growth of coarse grasses, enough for sheep. This has become one of the great sheep raising and wool shipping regions of the world. Railroads have been built out into the sheep country from Buenos Aires to take the wool to the ships that carry it to Europe and the United States.

The plains and mountain valleys of the extreme southern end of South America were once thought to be barren and worthless. They are wet and cold, being a sort of tundra with low shrubs, grass and moss. The scattered Indians of this region had a hard struggle to make a living before the sheep men came and drove their herds over it. Now the game that the Indians depended upon is gone, and the Indians, being unable to live without it, are going also. The region has been made a vast sheep ranch. The wool is shipped from Punta Arena, the most southerly city in the world, and goes mainly to England.

The only large continents remaining that we have not explored for sheep and wool are Africa and Asia. There ought to be a belt of grass land between the Sahara desert and the tropical jungles of Central Africa. In fact, we are sure there must be, for it is from this region that the great herbivorous or grass eating animals come that we see in menageries. Among these animals are the elephant, giraffe, zebra, gazelle, ox, etc. Why is it that no sheep are kept here? The region is inhabited by uncivilized negroes who support themselves mostly by hunting. Some of them have small gardens in which they raise vegetables and melons, but they have no domestic animals.

We have learned that South Africa has a climate like that of California. Why might we not get wool from there? The plateau lying back of the orange belt of Cape Town is inhabited by Boer farmers, who long ago settled the region. Among other products they raise a great many cattle and sheep, but none of their products ever reach the United States because the region is a colony of England and she wants all the wool and leather she can get.

What about Asia as a source of wool for our mills? The most of the inhabitants live upon the southern and eastern coast lowlands and are so crowded that every foot of the land must be used to keep them alive. There is little room for sheep and cattle.

The vast interior of Asia, you will see from the map, is just the opposite of North America, for it is mostly a tableland so high and so cold that there are very few inhabitants. If, in a few places, they keep sheep they want all the wool for their own clothing. The people of Western Asia raise sheep and use a part of their wool for weaving the beautiful rugs that we get from there. Out of what wool is left they make their own clothing.

We now come to the small and distant continent of Australia. Although it looks so small upon the map, yet it is really large enough to support a great many sheep, if there are pastures for them that are not suitable for other purposes.

The map shows us that the northern part of Australia lies in the tropics and therefore must be covered with forests and unsuited to farming or grazing. It also shows a high mountain range lying along the eastern side. The extreme southern part we have already learned has a Mediterranean climate, with its orange and lemon groves.

It is the eastern mountain range that makes of Australia a great sheep country. This range cuts off the southeast trade winds which would, were it not for these mountains, bring rain to all the central part. As a result, the region behind these mountains has little rain, and this little becomes smaller still the farther we go inland, until at last we reach the great central desert.

This is a vast area called the "Bush", where there is not enough rain for farming and no streams to supply water for irrigation, but there is sufficient to make a scrubby growth of bushes and tough grasses. This region has been taken possession of by the sheep men who have developed so great a business that Australia is more widely known for its wool than anything else. A part of this wool comes to the woolen mills of the United States by way of California, and a part goes to England.

While we are in Australia, we might go a little farther to the Island of New Zealand, where there are so many great sheep ranches. New Zealand is a beautiful and fruitful land, but it is so far from markets for farm produce that stock raising has become the chief industry.

These journeys over the world in search of the places where our wool is grown have shown us also why the people of some countries wear little woolen clothing, but use cotton

in its stead. Wool usually costs more than cotton and is harder to get in countries where few sheep are kept. Wool is too warm for the natives of the tropics to wear, and besides this most of these people are uncivilized and have little use for clothing of any kind. Their home is also mostly forested and it is all they can do to keep little patches cleared, because of the quick growth of wild vegetation.

The Chinese wear little wool, though in north China the winters are very cold. They succeed in keeping warm in cotton clothing by padding their garments and thus making them thick and heavy. The little children are dressed in their padded clothing in the fall and this is not taken off until the warm weather comes in the spring.

The Chinese are usually too poor and have to struggle too hard for a living to buy woolen clothes. They do not raise many sheep or other animals, except in the far northern part, because they cannot afford the land to grow forage for them. Thus the Chinese have learned to carry their own loads instead of using beasts of burden. By means of a pole across their shoulders, they carry enormous loads long distances. In



Originally wooded; settled, cleared and ruined since 1725, Fou-ping, Chili Province, China.

some parts of China they use huge wheelbarrows for carrying goods.

Wherever we go over the earth, we discover that mountain people, if their slopes are not too heavily forested, keep sheeps and goats. Winters in the mountains are cold and the surface too rocky to be used for any other purpose than as pastures for sheep, goats and cattle.

Our journeys have shown us also that desert people, or those living on the border of the desert, keep enough sheep to supply themselves with wool, but none to sell unless when it is woven into rugs. In addition to sheep, these people keep goats, horses and camels. Since forage is scanty they have to live in tents and keep moving from one place to another. Parts of the Sahara desert, parts of Arabia, the region about the Caspian sea, in Russia and Siberia; and parts of Persia support these wandering people. Wherever the rainfall is a little greater, or there is water for irrigating little patches of ground, the desert people build permanent homes of clay or stone and live in one place.

In the western parts of our own country it has been the custom for many years for herders to go out into the desert or mountains with bands of sheep, camping and living with them for months. Bands of sheep once ranged up the slopes of the Sierra Nevada and other lofty mountains in California. They kept climbing to higher pastures as summer advanced and not until late in the season did they reach the upper meadows where the grass was short but nourishing. The sheep, however, did so much harm to the grass and young trees, the roots of which held the soil, that water from the rains and melting snows ran off faster. This lessened the summer flow of the springs so that the farmers in the valleys began to suffer. The pasturing of sheep, as well as cattle, in the mountains of California is now very carefully regulated.

Cotton comes next after wool as the most important material of our clothing. Perhaps some of us may think cotton is more important for us than wool. It certainly is for people in some parts of the world. The cotton belt of our Southern States produces more than half the cotton of the world. The people of the United States do not need to go out of their own country for their raw cotton, or for their cotton cloth, since in New England are so many cotton factories that they not only make all the cloth we use but send it to all parts of the

world, unless it be England, where a great deal of cotton cloth is made.

It has recently been discovered that the hot valleys of California and the adjacent parts of Arizona grow as fine cotton as is to be obtained anywhere. The Great Valley may, in addition to its fruit of every description, its rice, alfalfa and grain fields, become also a great cotton field. At present the most of California cotton is grown in the Imperial Valley. We do not as yet grow all the cotton we use in California, but if you could travel over the vast fertile delta of the Colorado river and see the miles of vacant land that might be turned into cotton fields, as well as the great fields that are already there, you will say that all the cotton used in California will be grown here, as well as much for export.

Cotton thrives in a wide belt running all the way around the world. It must have a hot summer without danger of frosts. The plant does not seem to care whether the climate is moist like that of our Southern States or dry enough to make irrigation necessary. If we went to Egypt we could see many cotton fields. In India we would see them also, but in many other countries where the climate is suitable for cotton very little is raised.

Your mother takes great pride in her linen tablecloths, napkins and handkerchiefs, but she finds that they cost a great deal. Why is it that linen costs so much since flax, from the fiber of which it is prepared, can be grown over a large area in the upper Mississippi valley?

Flax supplies us with two important products—one is the fiber which is made into linen; the other is an oil called linseed oil. This is used in mixing paints and in making oil cake valuable for feeding cattle. Much flax is grown in the Mississippi Valley, but only for the oil it contains. The separating of the fiber from the rest of the material of the stem has to be done by hand, and as we have to pay workmen so much more in our country than they get in other parts of the world, it does not pay us to prepare the fiber for weaving.

Flax is grown in many parts of the world that have a climate somewhat like the upper Mississippi valley and where the women and children as well as the men work in the fields. A great deal is grown in Russia and the countries of Central Europe, India in Asia, and Argentine in South America also grow much flax. If we want to visit the country where most

of the flax fiber is shipped to be woven into linen, I am sure you can tell us where to go, for everyone has heard of "Irish linen".

THE FOUR MOST IMPORTANT CATTLE REGIONS OF THE WORLD ARE: THE UNITED STATES, EUROPE, INDIA AND SOUTHERN SOUTH AMERICA. WHY IS IT THAT FROM INDIA, THE GREATEST OF THEM ALL, WE GET NO HIDES FOR OUR BOOTS AND SHOES?

It is very interesting to hunt out those parts of the world in which cattle are raised in large numbers and where we would likely be able to buy hides for our factories to make into boots and shoes. We should, however, before starting upon our travels find out from what we know of the habits of cattle and what they feed upon and in what parts we are most likely to find them in large numbers.

We know, to start with, that cattle cannot be profitably raised in large numbers in a country covered with dense forests, for while they browse on bushes to some extent, their chief food is grass. Cattle do not thrive in desert or half-desert regions where sheep are often found, for cattle require more water than sheep and are more particular about what



The grassy slopes of the high alps are dotted with cows during the short summers. During the most of the year snow covers everything.

they eat. Regions with a cold, damp climate, such as the extreme southern part of South America and Scotland, are better adapted to sheep than to most cattle, although there are some breeds that have become used to such climates.

We should learn also before starting out to buy hides what people raise cattle for in different parts of the world. Are they raised for milk, butter and cheese? Are they raised chiefly for meat products, or are they raised for their hides and tallow? We know from our study of California that cattle in different regions are raised for different purposes. The cattle upon the plateau in the northeastern corner of our State are raised chiefly for their meat products.

Large herds of cattle are kept about our cities for dairy purposes. The city people must have their milk and cream every morning. Other dairies are scattered throughout the large valleys and the milk made into butter and cheese.

We raise range cattle because there is a great deal of land scattered throughout the mountainous parts of California that can be used for no other purpose but pasturing cattle or sheep. To keep beef cattle confined in yards and feed them alfalfa or grain hay would make them cost too much.

Now let us turn to Europe and see what we can learn about its cattle, since this is one of the four important cattle raising regions.

The cattle map of Europe shows that they are most numerous in the western part, in the region where people are also most numerous. Does not this mean that these cattle are raised especially for their milk and the butter and cheese made from it? They are not raised especially for beef, although many are used in that way.

Holland, Belgium, Denmark, Switzerland, Ireland and the northern part of Italy and the northwestern part of France have the most cattle. There are many cattle raised in Southern Europe, but the people drink very little cow's milk, using goat's milk instead. In this land of summer drought that we have already been studying, the lack of rain does not favor green pastures during the dry season. Goats make a living and give milk where cows could not.

Cattle are kept throughout Russia, but there are almost no milch cows in the southeastern part. Russian people, as a rule, go without milk. Does not the fact that there are few milch cows in the region about the Caspian sea tell us some-

thing about the lives and habits of the people living there? If they have cattle and yet do not milk any cows, we must come to the conclusion that they are nomads—that is, they wander from place to place with their cattle, sheep and horses in search of pasturage, because the climate is too dry for them to raise crops. Southeastern Russia is then a pasture land, or “steppe”, and similar to the dry plains in our own country where the cattle used to range before the building of irrigation ditches. If southeastern Russia is a vast pasture land, it cannot be thickly inhabited.

Continuing eastward from southern Russia into Siberia, we find ourselves still among the nomads. Here are the Kerghiz living in tents and moving here and there in search of pasture. They use the skins of their sheep and cattle partly for clothing and partly to stretch over their rude dwellings.

Ought we to look for many cattle in Africa? North Africa bordering the Mediterranean is, as we have already learned, much like southern Europe. The natives keep many goats and sheep. Central Africa is the home of the black men. They do not keep cattle, although the grass lands south of the Sahara desert would support domestic animals as well as they do the great number of wild ones.

The Boers of the South African tableland keep cattle as well as sheep, for they are so far from market that it does not pay them to raise much else. It is not likely that any animal products from this region ever reach our country, for South Africa trades mostly with England.

We have learned something of the sheep ranges of southeastern Australia and of the dry country in which they are situated. Between the sheep belt of the interior and the coast, where the trade winds bring abundant rains, is a belt that receives more rain than the desert where the sheep are. In this belt are great numbers of cattle kept for their meat and for their hides. Sometimes beef is carried in refrigerators from Australia to San Francisco, and we may also get hides from there. The most of Australia's products, however, go to the home country, England.

South America calls us back to show us what it can do in the cattle line. It must be that it is here we get the most of the hides that are shipped into the United States for the making of boots and shoes. The part of the great Argentine plain lying next to the east base of the southern Andes moun-

tains is, as we have already learned, very dry and suited to the raising of sheep.

As we journey eastward from the sheep ranges we come upon a belt of country where the rainfall is greater. Here cattle are kept in vast numbers. They run free and are taken care of by the Gauchos, in the same manner that our cowboys look after the cattle. These plains are called *Pampas* and are very much like the Great Plains of the United States.

The pampa is so level it is easy to build railroads across it. These roads carry the cattle to Buenos Aires. Here they are butchered and the meat placed on refrigerator ships and sent to Europe. The most of the hides also go to Europe, though our boot and shoe makers in New England get a part of them. While on the road to Buenos Aires with the cattle, we finally pass out of the stock country and come to a part of the great plain where the rainfall is sufficient to support wheat and corn. Neither of these products go to our country because of the immense quantities we raise ourselves.

But the pampa is not the only place where cattle are raised in South America. Across the mouth of the Plata river from Argentine are the little countries of Paraguay and Uruguay, whose inhabitants are mostly mixed negro, Indian, Portuguese and Spanish. They do not like hard work and so raise immense numbers of cattle upon land which, if cultivated, would return much more to the owners, since it is extremely fertile and the climate suited to every semi-tropical product.

Northern South America I am sure you will say is very wet because it lies within the belt of tropical rains. As a result of the heavy rains and great heat, might we not expect it to be covered with a dense forest jungle? In reaching this conclusion, we forget the mountains that are present and the influence which they have upon both temperature and rainfall.

The Orinoco is a great river, as you may see from the map. It flows into the Atlantic ocean through a broad valley bordered by lofty mountains. During the summer when the sun is overhead, in the Orinoco valley are almost constant rains. The valley, which is in places more than one hundred miles wide, becomes covered with a great sheet of water.

During the winter season, when the sun is farther south, the trade wind belt covers the region and the winds bring some rain from the ocean. But the mountains lying partly across the lower end of the valley cut off much of the moist-

ure. The valley is then quite dry for some months in the winter season, so that grass takes the place of the forests which would otherwise be found there.

Few settlers have made their way into this region, for the river as it approaches the ocean splits up into many mouths, making navigation difficult. The settlers are mostly Spanish and Indians, who, on account of the summer floods, find it necessary to build their homes upon piles or place them many miles back from the river on high ground.

Many thousands of cattle are kept upon the grassy plains or Llanos, in addition to horses and mules. Very little use is made of the cattle because of the difficulty of shipping them out. Live cattle are sent down the river to supply the towns on the coast with meat. Nothing, unless it be hides, is shipped away to help make the world's shoes.

We come now to India, that country which contains the largest number of cattle of any in the world, but from which, strange to say, we get no hides for our boots and shoes. The hides are not shipped to Europe, nor do the people themselves make any use of the leather. India is a hot, tropical land where the people are very poor and crowded and often go without nourishing food. They generally go barefooted, although those who are able to do so wear some sort of slippers.

What use do the Hindus make of their cattle? They do



Train of llamas in the Peruvian highlands.
(The llama was the only beast of burden
in America before the coming of
the Spaniards).

not kill them for meat, for it is not only against their religion to kill animals, but they are also forbidden to eat meat. If you will take a journey through India you will soon discover what use is made of the cattle. They take the place of horses in pulling their carts and wagons, in plowing and tilling the

ground and for every purpose for which we use horses, except for riding.

The cattle are hump-backed and very different in appearance from ours. The natives do not milk them, nor do they use milk from any animal. Certain ones among the cattle are considered sacred in connection with their religion. These are allowed to wander through the streets and temples at pleasure. Sometimes we see the sacred cows with wreaths of flowers hung upon their horns. The sacred animals are also allowed to go into the markets and eat vegetables from the stands. Although the keepers of the stands are poor, yet it is considered a good omen for a sacred cow to eat at their stands, and they do not drive it away.

Among the strangest sights of India are the wagons and carts used. A pair of white hump-backed cows hitched to a wagon, with a canopy over it, makes an interesting picture. When the Mohammedan women go out riding the curtains of the canopy are kept down so that no one can see them.

In addition to the common cattle, there are water buffalo or caribou. These animals are used to do the heavy work. The cattle are all very gentle and easily handled.

We have now followed cattle over the whole world, in our search for hides, and found only a few regions from which



Bullock carts, thatched with palm leaves and drawn by cream-colored zebu cattle, India.

we get any for use in our country. Cattle are kept by almost all people except savages, and in every place except in the dense forests and in the cold northlands.

Tanning of the hides as they come to our country, to make leather of different kinds, is a very important industry. The bark of different trees, especially of certain kinds of oak, is used in tanning. In California we have the tanbark oak, which grows upon the damp northern coast. Tanneries are built at convenient points for obtaining hides as well as the

bark. The best situated region for tanneries in our State is about San Francisco Bay.

Other materials than leather are used in making boots and shoes, the chief of which is rubber. The substance is now used for so many purposes that we will now try to find out something about where it is obtained.



A water carrier of India. The gentleness of the cattle of India is remarkable. They are used for all sorts of purposes and never make any complaint.

The name "Indian rubber" was given to an elastic substance seen in the hands of the Indians soon after the discovery of South America, because it had the property of removing pencil marks. There are many different kinds of trees and vines in the tropical forests all over the world which have a milky juice that turns to a solid elastic substance upon drying. The best rubber trees are natives of South America. In the Amazon valley is one in particular which produces what is known as "Para rubber" that is superior to any other.

Of all the products of the tropics that we use in large quantities, rubber comes from regions which have a climate most difficult for white men to live and work in. The Para rubber is obtained from a tree which grows naturally only in the hot, wet and, we might almost say, steaming lowlands of the Amazon river and its tributaries.

Because of the unhealthfulness of the climate as well as

the great heat, the rubber gatherers in the Amazon valley are all Indians. The trackless forests are so dense that they have to almost hew their way through them in their search for the scattered rubber trees. Only the immediate lowlands have as yet been explored for rubber trees, and doubtless there are millions never yet seen by anyone. Rubber is now in such demand and the forests of South America so difficult to penetrate that extensive rubber plantations have been made in the East Indies and these will doubtless be extended to Africa and all other tropical regions. Find out what you can about the preparation of rubber and its many uses.

WE WEAVE SILK IN THE UNITED STATES, BUT WHERE DO WE GET THE RAW SILK?

Cotton, wool and leather are three materials of our clothing which we could not get along without.

The United States produces so much of the first that it not only has enough for its own mills, but a large surplus to sell. It does not have enough of the second and third and we have just learned where we have to go to get what is lacking.

Now we come to a material which we do not really need, and yet this material produces such soft, beautiful garments that we feel we cannot get along without it. I am sure that you will all guess that I am speaking of *silk*.

Why do we not produce this material that we admire so much, and where do we have to go to satisfy our desires, are problems for our geography.



This picture shows the balls of crude rubber as they come from the forest of the Amazon Valley in South America, and ready for shipment to the United States

First, we must repeat the story of how silk is made. This story will tell us in what part of the world to search for the home of silk.

The tiny eggs, half the size of a pinhead, lying there upon a sheet of paper, will hatch by and by and little worms will emerge. If mulberry leaves are at hand they will crawl upon them and begin feeding. When the worms have grown to be two inches or more in length they stop feeding and weave about themselves a fine thread drawn out of a substance in their own bodies. This thread may, in the case of large worms, be as much as half a mile in length. Finally the worm is hidden, stops its work and becomes a chrysalis. From this chrysalis comes finally a little moth which lays the eggs with which we began.

Some time, far back in antiquity, before men learned to write things that happened, the Chinese observed some little worms feeding upon the leaves of the mulberry trees and the cocoons of fine thread which finally took their place. They learned how to care for the worms, and how to unwind, spin and weave the fine threads into the most beautiful of silk cloths.

Hundreds of years ago some monks stole some silk worms from China and brought them to Europe. Mulberry trees were obtained from another place and the making of silk was commenced in Europe. The raising of silk worms spread from China to southeastern Europe also and is now carried on wherever the climate is suitable for the growing of mulberry trees.

The mulberry tree thrives in the southern half of our own country, and in California. We are all familiar with the pleasant tasting little berries borne by the trees. Since the tree grows here, why do we not raise our own silk worms, prepare the threads and weave silk cloth? We would save millions of dollars which we now spend for silk in China, Japan, Italy and France. Sometimes a single cargo of silk from China unloaded in San Francisco is worth a million dollars.

We have already learned in our geography studies that some things, a certain kind of fruit for example, may grow in our country, and yet cost us so much more to produce that it would pay us better to turn our attention to other things and buy that particular fruit in some foreign country where the people can produce it cheaper than we can.

The raising of silk worms and the production of cocoons have been tried in southern California, but the cost of labor

is so great that thus far we have been unable to make the business profitable.

In far away China there are millions of people willing to take care of the silk worms for a few cents each day. Once the unwinding of the cocoons and the preparation of the silk thread was all done by hand. Now there are factories in both China and Japan in which the cocoons are unwound by machinery. Hand looms are still in use for weaving the thread into cloth for the natives, who, with the exception of the very poor, wear more or less silk. The beautiful silk coats of the Chinese mandarins or nobles are covered with wonderful hand-made embroideries.

We buy some silk cloth from China and Japan, but most of the silk comes in thread and is woven into cloth in our Eastern factories. Throughout the Mediterranean region as well as in western Asia, the country people produce some silk and make attractive cloths to sell to tourists.

WE APPRECIATE FURS VERY MUCH IN COLD WEATHER, BUT IS IT NOT TOO BAD THAT THE HUNTERS WHO GET THEM FOR US HAVE TO LEAD A HARD LIFE AND ENJOY FEW LUXURIES?

Animals, no matter where they live, have a skin covered with hair or fur. The fur of those in the hot belt is short



Weaving silk cloth upon hand looms in China.

and poor, as we would expect it to be. Those in the temperate latitude in which we live have better fur, but it is only in the far northern part of the temperate belt and on the edge of the Arctic regions that the animals are found whose furs are most prized.

There is another thing besides heat and cold that helps us to find the home of the fur-bearing animals, and that is the distribution of the forests. We would not look in an open prairie-like country for fur-bearing animals, since they seek those regions where they can find hiding places and protection, and it is only in forests and rocks that this is to be had. The hunters of fur-bearing animals have, then, to make their homes in cold, forested lands, far from the comforts of life. I am sure you would not like to change homes with the white hunters or with those of the wild and uncivilized native hunters who live in the land of fur-bearing animals.

We have already learned that once many fur-bearing animals roamed over the United States, especially the northern part. As the hunters followed the little animals without pity and the forests were cut down and the land farmed, the animals were either killed off or sought the wild lands in the mountains, or in the far north. In these regions the forests still remain undisturbed. No farmers have settled in them and only the prospectors and hunters know their wild recesses.

If you will look at the map of the world you will find that most of the cold land lies in the Northern Hemisphere. In the Southern Hemisphere there is only a little cold land at the extreme southern end of South America. Travelers to this cold region say there are so few wild animals to be found there that even the few Indians inhabiting it find difficulty in getting game enough to keep themselves alive. North America, on the contrary, was literally filled with wild game when the white man first entered it.

In the high and cold Andes mountains of South America there is a group of animals, some species of which were domesticated by the Indians, but their coats are more in the nature of wool than fur. The Indians of the Andes are so put to it for winter covering, though they live almost on the equator, that they tamed the llama, alapaca and vicuna, raising them for their warm wool, which is sheared in the same way as that of sheep, and for food.

It would hardly pay us to go to Africa in search of furs,

because this continent has no cold lands except upon the slopes of a few high mountains.

Fur-bearing animals do not remain where people have thickly settled, so that we would also be wasting time hunting for them in southern and western Europe.

There remains, then, of all the lands of the earth only northern North America, northern Europe and northern Asia or Siberia in which we can expect to find valuable furs.

The native people of the cold forests and arctic tundras are much alike as regards their manner of life. The Indians of northern Canada, the Lapps of Europe and the Yakuts of Siberia lead a poor, hard life in search of food and skin clothing. Until the white hunters came with their guns, the wild animals were not in danger of extinction. The Hudson Bay Fur Company has stations all over the northern part of North America. To these stations the Indians each spring bring the pelts they have taken and get from the agents luxuries which once they knew nothing about.

So highly are furs prized by civilized people that all the northern regions are now being hunted over so thoroughly that each year the furs become scarcer and cost more. So



The members of this Lapp family are all dressed in furs. Meat forms their only food except in summer when there are birds' eggs and berries.

valuable did Russia believe the furs of Siberia to be that she conquered it chiefly for them. Russian soldiers, fur hunters and traders went over the country together.

But fur-bearing animals are not confined to the land. Seals, sea otter and some others once lived on land, making their homes in the north and growing a fine furry coat. When they went to live in the ocean they had, of course, to change their legs to paddles, but they kept their fine fur coats, for the northern ocean is very cold. The animals raise their young on the land but spend most of their lives in the water, where, in search of food, they travel hundreds and even thousands of miles.

The beautiful sea otter is almost extinct, but the fur seal, which raises its young on the Pribylof Islands, in Bering Sea, is carefully protected, so that we shall probably always have seal-skin furs.



A postman making his rounds in the cold north

CHAPTER 25.

TREES AND PLANTS OF OTHER LANDS AFFORD US IMPORTANT MATERIAL FOR VARIOUS PURPOSES. WHICH WAY SHALL WE GO TO FIND THEIR NATIVE HOME AND THE PEOPLE WHO SUPPLY THEM?

Fiber plants interest us, first, because they possess so great a value. The handsome cloth known as *burlap* and the coarse fiber *jute* are produced from Indian hemp, which is cultivated over immense areas in the hot, wet valley of the lower Ganges river in India. It is from this region that the jute comes that is used in the manufacture of barley sacking carried on by the California State Prison.

Common hemp thrives wherever flax can be grown and a great deal is produced in Europe. The fiber is used for cordage and coarse cloth. Hemp also thrives in the United States, but we do not raise much because it requires so much hand labor. Hemp is grown in a great variety of climates, from the tropics to northern Russia, and is cultivated by all sorts of people who are civilized enough to wear clothing. It



In Normandie, France, the women beat out the fiber of the hemp. This work has to be done by hand and that is the reason we grow so little in the United States.

must have at least three months of summer in which to mature, without danger of frost.

Sisal hemp comes from nearer home, for the plant is a native of Mexico, Central America and the West Indies. One kind grows in California, where it is known as the agave or century plant, because it takes so many years for it to get ready to send up its gigantic flower stalk. Like some other plants of dry lands the agave grows with little care, but will become much larger if given an abundance of water. In the hot district of Yucatan, in southern Mexico, sisal hemp is grown on immense plantations, being cared for by Mexican peons and Indians, who are little better than slaves.

The best hemp comes from the Philippine Islands, and because the shipping point is Manila, we call it Manila hemp. It is made from a kind of banana palm, which has long, strong fibres. Manila rope costs more in our stores than any other,

but it is the strongest and most lasting. The inner and finer fibers of this palm are used in the manufacture of gauze and veils. This fiber plant must have plenty of water and a moist air, thus differing greatly from the agave.

A fibre used by nurserymen to tie up plants is known as *raffia*. This is supplied by a palm commonly known as "wine palm," because from its trunk the natives of the west coast of Africa, where it grows, make an intoxicating drink.



A giant yucca tree upon the dry plateau of Mexico. At its base is a hedge of agave plants (century plant).

Bamboo thrives up to a height of two miles above the sea, upon the slopes of the Himalaya mountains in northern India. It grows upon the slopes of the Andes mountains in South America to a height of nearly three miles above the sea. Some varieties grow to nearly one hundred feet in height, while others are extremely small, being not much larger than coarse grass. In Japan many of the hill slopes are covered with a small bamboo, which from a distance looks like grass. This bamboo crowds out grass, and as it is tough and unfit for cattle to eat, there is very little pasture land in Japan. This is one reason the Japanese do not keep cows and hardly know the taste of milk.

To the people of such a treeless land, as is the greater part of China, the bamboo is a great blessing, for it grows easily and quickly. They use it for every purpose we use wood, and for many besides. The bamboo is as necessary to the people who live in southeastern Asia as iron is to us. They use it in house construction, in making baskets and mats, while the young sprouts are cooked and eaten.

We find the bamboo useful chiefly in making furniture and for fish poles. Several kinds of bamboo thrive in California, and we could grow all we needed if we wished to do so.

Rattan is another material used in making baskets and furniture. It is made from the fibers of a palm that grows in southeastern Asia, and is of very great value to the people of those lands.

TO WHAT EXTENT ARE WE CALIFORNIANS DEPENDENT UPON OTHER PEOPLE FOR MINERALS AND PRECIOUS STONES?

California first became known through its gold deposits, and since that time it has been found to be rich in many other minerals. But there are some minerals which are very useful and others ornamental that have never been found within our borders.

Nearly everything made of iron, copper, zinc and lead comes from the mills and factories in the eastern part of our country. We mine copper and send the crude metal to the Eastern States, finally getting it back in the form of wire, dishes and hundreds of articles of different sorts.

We usually call coal a mineral, though it is really of vegetable origin. California does not have much coal. A part

that we use comes across the mountains on the railroads and a part from distant lands such as Australia and England. We have more fuel oil than we know what to do with and could get along very well if we had no coal at all. The mild climate of the valleys of California makes only a small fire needed in our homes, while in the mountains there is plenty of wood.

Tin is one of the important metals of which we have none. The tin in our dishes comes from far away East India islands and southeastern Asia, where there are large mines.

The most of the precious stones that we see in jewelers' windows are useful only as ornaments. The diamond is an exception, for its hardness makes it very useful to those who cut and polish stone.

Platinum is now more valuable than gold. The most that we have comes from the Ural mountains, between Europe and Asia. The miners there do not like to work any more, or perhaps they cannot; anyway, platinum has become very scarce since the World War. It is valuable for so many purposes in various industries that we cannot get along without it.



In a tin mine, Cornwall, England. The car is filled with ore and pushed along the tunnel to the shaft when it is lifted to the surface.

The distribution of minerals over the earth, and how they are mined, is not really a part of our geography. But as far as the climate, accessibility and means of transportation have to do with our getting and using them, their study belongs in our subject.

We have now gone over and talked about the leading substances which the people of California use, but which they cannot find at all, or only in small quantities within their borders. We have learned something about the countries from which these products come, about the people who get them or prepare them for us, and how they reach San Francisco or Los Angeles.

INDEX

- Appalachian Mountains, Influence of, 96
 Bakersfield, 57
 Bamboo, 201
 Berkeley, 66
 Big Trees, 61
 Cacao, where produced, 174
 California, Advantages of, 7; climate, 9, 62; streams, 27, 40, 37, 50; shipbuilding in, 29; disadvantages of, 31, 42; Coast of, 31; scenery of, 33, 61; mountains of, 62; highways of, 62
 Cattle raising, of Eastern States, 113; of the West, 111, 114; chief regions of, 186-192
 Camphor, 176
 Climate, of California, 9, 34; influence by mountains, 32
 Chicago, 132
 Cities of California, location of, 64
 Cinchona, where grown, 175
 Coast of California, 53
 Colorado River, 40, 54, 59-60
 Coconut, uses of, 165
 Coca plant, 176
 Cotton in California, 43; cotton belt, 106, 185
 Coffee, where grown, 172
 Dairying in California, 42
 Date palms, 43, 165
 Delta, of Sacramento, 50; of Colorado, 59
 Deserts of California, 20, 62; minerals of, 25
 East Indies, 139
 Farming in Mississippi Valley and Eastern States, 129
 Flax, where grown, 185
 Forest protection, 118
 Forests of California, 20, 21
 Fruit canning, 29
 Fruit growing, 42
 Fur-bearing animals, 195-96
 Great Valley of California, 21, 54, 56
 Great Basin, 45; mountains of, 48
 Gulf of Lower California, 54
 Hudson Bay region, 100
 Hemp, 200
 Imperial Valley, 54
 Incopah Mountains, 23
 Irrigation in California, 35, 40; in Spain, 35, 40; on the Plains, 114
 Jute, 199
 Klamath Mountains, 50
 Leather, 186, 192
 Lincoln Highway, 47
 Long Beach, 75
 Los Angeles, situation of, 55; water supply of, 37-39; problem of, 69-73, 76
 Lumber industry, 115-117
 Market gardening, 130
 Manufacturing in New England, 122; in Middle States, 123; in Western Highlands, 126; on Pacific Coast, 128
 Mediterranean climate, of Mediterranean region, 143, 145; of California, 14; of Central Valley of Chile, 149; of South Africa, 151; of Australia, 152
 Metals, 202
 Mining in California, 42, 18; value of, 27

- Mountains, influence of, 12
- Modesto, 58
- Mississippi Valley, products of, 104
- National Forests, 119
- Natural barriers in California, 51
- New Orleans, 107
- North America, surface of, 81; climate of, 82-85; a hunter's paradise, 90; early industries, 93-95; distribution of early settlers, 95; early transportation, 101; farmers of, 102; waterways of, 102; coasts of, 108-09
- Oakland, 66
- Opium, where grown, 175
- Packing industry, 126
- Palms in California, 164
- Petroleum, story of, 19; industry, 44; importance in California, 19
- Philadelphia, 131
- Prairie region, 99; extent of, 111
- Raffia, 22
- Railroads to California, 48-50; in United States, 133
- Rainfall of California, 11
- Rice, 43; distribution of, 168
- Rivers of Western Highlands, 126
- Raisin industry, 26
- Sacramento, 53, 56
- Salton Sink, 41, 60
- San Bernardino Mountains, 21
- San Francisco Bay, 53
- San Francisco, problem of, 66-68, 76
- San Joaquin Valley, 57
- San Diego, 65, 75
- Santa Barbara, 75
- Santa Monica, 54, 75
- Sierra Nevada Mountains, 21
- Stock Ranch, life on, 111
- Sugar cane, 168
- Surface features, influence upon industry, 17
- Stockton, 57
- Silk, 193
- Tea, where grown, 170
- Trade, reasons for, 178
- Trails to California, 45, 47
- Tropical, 15
- Trade centers, 53-54, 56
- United States, advantages of, 134; compared with Mexico, 136; compared with Canada, 137; disadvantages of, 137
- Volcanoes, 62
- Wool, where produced, 176-182; why worn, 182

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